VOLUME IV SEPTEMBER, 1913 NUMBER 7

THE JOURNAL OF
EDUCATIONAL PSYCHOLOGY

PRELIMINARY STUDY OF THE RELATIVE EFFICIENCY OF INDUCTIVE AND DEDUCTIVE TEACHING OF LOGICAL REASONING.

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(Communicated by G. M. Whipple.)

Studies from the Cornell Educational Laboratory, No. 15.

I. Introductory.

This experiment is an outgrowth of two lines of interest, the one psychological and theoretical, the other pedagogical and practical.

In an interesting discussion of the doctrine of formal discipline[1] Professor, now President Meiklejohn has held that the result of training along a specific line of activity is to develop certain 'patterns' or 'forms' of thought, which may thereafter function to advantage in other and different specific activities. "For the empirical science of logic the term 'form,' as applied to our intellectual processes, indicates a common element, or a series of common elements, in those processes, which makes the theory of formal discipline at least intelligible and apparently tenable as a doctrine of intellectual training" (p. 132). In passing from one activity to another, then, the content would be changed, but a certain way of handling this content might be common to the two activities. One naturally thinks

[1] *Is Mental Training a Myth?* Educ. Rev., 37, Feb., 1909, 126-141.

of the various forms of reasoning, the valid forms of the syllogism, as illustrative of these forms of which Meiklejohn speaks. One thing, then, that we had in mind in this experiment was to see whether practice in detecting different fallacies of reasoning in a considerable number of concrete cases would, or could be made to, build up *inductively,* in the minds of our observers a number of patterns of these fallacies, and in such a manner that, when these fallacies recurred in other settings and other material, they would be speedily detected, subsumed under the 'forms' and thus mentally 'ticketed,' as it were. We hoped, also, to get some introspective account from the observers of the genesis and nature of these forms, if so be they were developed and were accessible to their introspection. This hope, it may be said at the outset, was not realized—whether from error in our method or incapacity of our observers or from actual impossibility of the task, we cannot say.

Secondly, as our plan of experimentation really suggested such a course, we were interested to compare the ultimate capacity of our special group of observers to detect fallacious reasoning with the capacity of a second group of observers who had not had our special inductive training, but who had had the regular course in formal logic given in the University. On this, the pedagogical and practical side of the experiment, we had, then, in a small way, an opportunity to test the relative efficiency of inductive and deductive teaching.

II. General Plan of the Experiment.

There were two groups of observers: Group I had never studied logic; Group II had finished a course in logic, including about 48 hours of classroom exercises covering "the general character of the thinking process, its laws of development and the methods by which thought actually proceeds to solve the problems presented to it, together with the analysis of logical arguments and the detection of fallacies." Group I, the 'tutored' group, was given a special drill (about 20 hours in all) in detecting some twenty characteristic forms of fallacious reasoning. This drill was virtually in two periods. In

the first, or learning period, one or two examples of each fallacy were presented and explained from concrete material, and the name of the fallacy was given as a 'label.' In the second, or drill and review period, the same fallacies were reviewed, while a number of valid bits of reasoning and a few more examples of the original fallacies were added for further practice. Finally, both the 'tutored' and the 'class-taught' group of observers were submitted to a long series of test-examples, and were carefully graded on their ability (1) to detect fallacies, (2) to explain the nature of the fallacies detected, and (3) to designate those fallacies by their logical name.

III. The Observers.

The observers of Group I, who had never studied logic, were Mr. *C,* a freshman in the College of Law, Miss *G,* a sophomore, and Mr. *B,* a junior in the College of Arts and Sciences.

The observers of Group II, the 'class-taught' group, were Miss *Ad,* a senior who had taken logic three years ago, Mr. *Mt,* a senior who had taken logic two years ago, Messrs. *Sc* and *Hl,* juniors who had taken logic one year ago, and Messrs. *Wn* and *Fr,* who had just completed the course in logic.

Care was taken not to have the students in either group, particularly the 'tutored' group, of very greatly superior ability to the other group. We took pains to compare the ability of the observers of both groups from their class standing, the judgment of the instructors in the university, and from personal impression. There is positively no doubt that at least three of the 'class' group are equal and probably superior in general ability to any one of the 'tutored' group.

IV. The Tutoring of Group I.

Examples of the following fallacies were collected—Undistributed Middle, Illicit Major, Illicit Minor, Negative Premises, Denying the Antecedent, Affirming the Consequent, Imperfect Disjunction, Composition, Division, Accident, Begging the Question, Dilemmatic Fallacy, Irrelevant Conclusion, Non Sequitur, Careless Use of Language, Disregarding Negative

Instances, Post hoc ergo propter hoc, Hasty Generalization, False Analogy, and Individual Prepossessions. Some of these, such as Irrelevant Conclusion and Individual Prepossessions, include sub-forms, but in these cases the general name was commonly used instead of the particular name. Either designation was considered correct in the tests. Thus we see that there were about twenty types.

Each of the 'tutored' group, as before stated, was given about 20 hours' instruction. This instruction was for the most part given to two or all three together, but in part individually. (We might here state that about 18 hours is given to the study of fallacies in the regular course.)

In order to make clear what is meant by teaching in an inductive way from the examples themselves, we may show how one case was treated. The instruction was as follows:

Example written on the blackboard:

If the strike has been called off, the men are back at work.
The strike has been called off.
Therefore, the men are back at work.

"Is this argument valid?" "I think it is." (At this point we defined antecedent and consequent). "What does the second premise do?" "Says that the antecedent is true."

Second premise now changed to read:

The strike has not been called off.

"Can we conclude that the men are not back at work?" "No." "Why not?" "Because the strike might be only one of a large number of things that would keep the men from going back to work. They might be back for some other reason, even though the strike was not called off."

Second premise now changed to:

The men are back at work.

"Can we conclude that the strike has been called off?" "No, the men might be back for another reason and the strike might still be on."

Second premise now changed to:

The men are not back at work.

"Can we conclude that the strike has not been called off?" "Yes, for if the strike *were* called off the men *would* be back at work according to the first premise."

"In what cases did we get a wrong conclusion?" "Where the second premise was either

(a) The strike has not been called off, or
(b) The men are back at work."

Now the observers were told that (a) was called the Fallacy of Denying the Antecedent and (b) the Fallacy of Affirming the Consequent.

In a manner somewhat similar to this we took up the other examples. We got the observers to understand each fallacy by carefully considering a typical example of it and noting what was wrong in this example. Then we gave them in each case the name of the fallacy which the type illustrated. This concluded the first period of the instruction.

In the second, or drill and review period, as has been explained, we took the typical examples which had just been used, added to them a number of examples of valid arguments and a few more examples similar to the typical ones. We asked each observer to state three things with regard to each of these examples—(1) Valid or Not, (2) Reasons, (3) Name of Fallacy (if any).

These examples were given to the observers until each of them could tell wherein the trouble lay, and could name the fallacy that the type illustrated. After they knew all of them, without regard to the order of presentation, we were ready to introduce the final test-examples.

V. The Final Testing of Both Groups.

The collection of suitable material for these tests was no easy task. We wanted instances of all the fallacies, but it was necessary to avoid those that were over-technical in their content: persons without knowledge along certain lines, chemistry, for example, could not be expected to detect a fallacy in an argument full of technical terms. Many examples had to be discarded for this reason alone. Then, again, economy of time and a desire to avoid too great complexity caused the rejection of numerous lengthy examples. However, eventually, 92 satisfactory concrete examples of reasoning were collected[2] and typewritten on separate cards. Lack of time com-

[2]About 30 were taken from newspapers, magazines, and personal experience. The rest were drawn from Creighton's *Logic*, Bode's *Logic*, and Lafleur's *Illustrations of Logic*. Many of these examples were also originally discovered by the authors just cited in newspaper and magazine articles.

pelled us to relinquish our original intention of giving all 92 test-examples to each observer: we did, in fact, give all these examples to Group I, but for Group II we selected 45 of the examples, and in such a manner that 6 were valid and 39 fallacious, and that each of the 20 fallacies previously cited was represented by at least one example.

In making this final test, the same instructions were given to each observer: he was asked to state with regard to the example before him: (1) valid or not, (2) his reasons for calling fallacies any argument so adjudged,[3] and (3) name of the fallacy, where the argument was adjudged invalid. We recorded the time taken from the beginning of reading each test-example to the end of the observer's report upon it, although we warned the observers that the time was merely incidental and that they should not feel that they were under a time-test. In some examples we gave to each observer certain explanations which we considered necessary.

A word should be said about the *method of scoring.* The first task, decision as to validity, was scored either *right* or *wrong;* the second task, explanation of fallacies in the observer's own terms, was scored *very good, good, fair, poor* or *none;* the third task, assignment of name of fallacy, was scored *right, wrong* or *none.* Some of the arguments could properly be cast into more than one logical form: in the instances in which observers chose to arrange the argument in a form different from that we had had in mind, but which was nevertheless legitimate, the decision was given a perfect score, provided, of course, the variant interpretation was really correct.

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[3]When an observer adjudged an argument valid, he was not required to state his reasons. We now believe that it would be better, if anyone were to repeat this experiment, to have the reasons given in all cases, whether the arguments be pronounced valid or not.

VI. The Results.

We present first some sample results which will serve to indicate the sort of examples employed and the way in which the detailed data were secured. We shall then summarize the data for all the examples in a single quantitative array.

Example 13.

"If a nation wants protection, it is not prosperous under free trade, so England must be prosperous, since it does not want protection."

Obs.[4]	*Decision*	*Explanation*	*Name given*	*Time taken (in sec.)*
C	Not valid	Very good	Denying antecedent	90
B	Not valid	Very good	Denying antecedent	120
G	Not valid	Very good	Denying antecedent	180
Mt	Not valid	Poor	Undistributed middle	100
Wn	Not valid	Poor	Undistributed middle	120
Ad	Not valid	Poor	Undistributed middle	180
Sc	Not valid	Good	None given	300
Hl	Not valid	Good	None given	180
Fr	Not valid	Very good	Denying antecedent	120

Example 42.

"We should not heed the clamor for the initiative and referendum, for men like President Taft, Andrew D. White and Nicholas Murray Butler are opposed to them."

Obs.	*Decision*	*Explanation*	*Name given*	*Time taken*
C	Not valid	Very good	Appeal to authority	60
B	Not valid	Very good	Appeal to authority	30
G	Not valid	Very good	Appeal to authority	60
Mt	Not valid	Good	None	60
Wn	Not valid	Good	None	120
Ad	Not valid	Good	None	90
Sc	Not valid	Good	None	90
Hl	Not valid	Poor	None	120
Fr	Not valid	Very good	None	90

[4] In these examples and in the final table, the first three observers, whose names are represented by a single letter, are those of the 'tutored' group.

Example 61.

"J. H. Gallinger, leader of the Taft forces in New Hampshire and dean of the reactionaries in the United States Senate, has written a letter to the soldiers of his State, in which he says: 'As chairman of the Senate Committee on Pensions for many years, it was my special privilege to serve them, and I did so in every way possible. I want to appeal to the soldiers to do me a favor, and that is to go to the caucuses and vote in favor of Taft delegates.' He then comes across with a more cogent argument: 'It is a well-known fact that the man who is now opposing him so bitterly and unjustly was never favorable to pension legislation, while President Taft has unhesitatingly signed every bill that has been sent to him.'"

Obs.	*Decision*	*Explanation*	*Name given*	*Time taken*
C	Not valid	Good	Irrelevant conclusion	240
B	Not valid	Very good	Irrelevant conclusion	150
G	Not valid	Very good	Irrelevant conclusion	90
Mt	Not valid	Good	Appeal to people	70
Wn	Not valid	Good	Appeal to pity	130
Ad	Not valid	Good	None	90
Sc	Not valid	Very good	None	120
Hl	Not valid	Fair	None	120
Fr	Not valid	Fair	None	120

Example 64.

"Why does the murderer deserve death? The answer will be because he has deliberately taken human life. Then, of course, the same guilt is perpetrated and the same penalty incurred when the State deliberately takes human life in return. For wherein is there a difference? Both acts of homicide are perpetrated willfully, and to our mind the homicide of the law is worse than the homicide of the assassin, inasmuch as it is committed in cool blood and in the light of day."

Obs.	*Decision*	*Explanation*	*Name given*	*Time taken*
C	Not valid	Very good	False analogy	60
B	Not valid	Very good	False analogy	150
G	Valid	———	———	120
Mt	Valid	———	———	120
Wn	Not valid	Very good	False analogy	60
Ad	Valid	———	———	90
Sc	Not valid	Good	———	180
Hl	Not valid	Good	None	120
Fr	Not valid	Good	None	120

The results for the 45 test-examples given to both groups of observers are brought together so as to show for each observer and for the two groups (1) the correctness of the decisions as to validity of the arguments, (2) the merits of the explanations proffered for the decisions of invalidity, (3) the ability to designate the name of the fallacy, and (4) the average time taken (here in minutes).

SUMMARIZED RESULTS FOR 45 TEST-EXAMPLES WITH ALL OBSERVERS.

	Decision on validity.		Explanation.					Name given.			
Obs.	Right.	Wrong.	Very good.	Good.	Fair.	Poor.	None.	Right.	Wrong.	None.	Time.
C.	41	4	26	5	4	0	0	31	0	2	2.19
B.	43	2	22	4	7	5	0	19	11	3	2.28
G.	42	3	24	2	6	4	0	18	9	6	2.16
Aver.	42	3	24	3.6	5.6	3	0	22.6	6.6	3.6	2.21
Mt.	31	13*	8	5	7	7	1	1	10	17	1.71
Wn.	36	9	9	13	6	1	1	5	6	18	1.95
Ad.	32	13	9	7	4	5	1	1	4	20	2.06
Sc.	39	6	15	10	4	5	1	4	3	25	2.06
Hl.	36	9	6	11	7	5	2	2	1	27	2.64
Fr.	38	7	12	10	5	6	0	1	1	28	1.88
Aver.	35.3	9.5	9.8	9.3	5.5	4.9	1	2.3	4.2	22.5	2.05

(1) The table shows clearly enough that the decision as to the validity of the arguments was not very difficult, nevertheless there is a clear superiority of the inductively taught group; in fact, no one of the class-taught observers does so well as the poorest of the tutored group.

(2) The quality of the reasons advanced for the decisions of invalidity is very distinctly superior in the inductively taught group, for on the average, they gave 24 'very good' explanations as against 9.8 explanations of that quality on the part of the other observers.

(3) The fact that our inductively taught group should be some ten times as able to assign correctly the proper logical names to the fallacies detected as are the class-taught observ-

*Mt was unable to come to a decision with one example.

ers is, perhaps, less surprising, partly because the latter group had never had so much training in specifically 'labelling' fallacies, partly because some of them had not been dealing with these terms for intervals of one to three years. However, the two observers, *Wn* and *Fr,* who were fresh from the course in logic were practically as poor in this respect as the rest of their group.

(4) From the record of time taken in solving the examples no conclusions can be drawn; nor, indeed, was it contemplated as a matter of particular import. The average time per example was 2.21 min. for the tutored and 2.05 min. for the class group. The fact that the latter group failed in most instances even to attempt to name the fallacy would account for any real difference in these times.

VII. Conclusions.

The general conclusion which seems to be indicated is this: *The learning of the various forms of fallacious reasoning by an essentially inductive method makes the learner more efficient in the subsequent detection of fallacious reasoning, in the assignment of reasons for such fallaciousness and in the subsumption of the fallacies under their proper logical designations than does the formal study of logic as commonly taught in university classes.* That our specially taught group did 'carry over' the patterns they had learned in such a way as to be able to apply them to new material seems clearly evident from the tabular results just reported. It might be added, in further confirmation, that these observers decided correctly in every single case of the remaining 47 test-examples which have been omitted from tabulation because time did not permit us to use them with the second group of observers. In these extra 47 examples these specially drilled observers gave 'very good' explanations in from 26 to 29 cases and designated the fallacy correctly by name in from 26 to 29 cases.

While, however, we are fairly well convinced that a painstaking drill in the analysis of concrete examples of argumenta-

tion, taken from various phases of everyday life, could advantageously be substituted for the more deductive work of the ordinary course in logic—accompanied, as it too often is, by the sheer memorizing of logical 'figures' and rules, and while we are convinced that the belief that the average student of logic will, after his course in logic, actually apply the principles he has there learned, is a misleading and erroneous belief, we must, nevertheless, admit that this present experiment does not prove these convictions incontestably. It is for this reason that we have termed this a "preliminary study."

The criticisms that can be passed upon our work are fairly obvious. In the first place, we worked with only a few observers, though the differences we found are for the most part large enough to transcend the limits of unreliability on this score. In the second place, it would have been more convincing if we could have retested our specially drilled observers several months, or better several years, after the termination of our drill. In the third place, what is a more serious objection, we unfortunately compared two groups under not entirely equivalent conditions; we contrasted not only inductive with deductive instruction, but also individual instruction with classroom instruction. We are unable to say how great an error has been introduced by this disparity in the conditions. So far as actual number of hours is concerned, disparity, as has been explained, does not exist. Yet readers who are inclined to attach a large amount of importance to individual as against class instruction may feel that this is the most essential point of difference between our two groups.

In conclusion, then, we hope that this experiment may be repeated under more precise control and with the modifications that we have suggested in several places in our discussion. We would also recommend the introduction in the final testing of a third comparison group—one whose members had had no instruction whatsoever in the forms of argumentation. By employing some observers skilled in introspection it might also be possible to attack that phase of our study which we were unable to reach, viz., the question of the formation and

transfer of patterns of logical reasoning. Aside from the objective results already presented, our only light on this problem came from the statement of one of our tutored observers, who reported in several instances that he made a deliberate comparison of the test-example with the typical example that had been used in his training.

PSYCHOLOGICAL METHODS AS APPLIED TO ADVERTISING.

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The application of psychological laboratory methods to advertising problems has a twofold purport. It is of value to advertising and to psychology. For if the relative value of each advertisement in a set may be determined accurately before it has been used, then much waste may be eliminated by simply not using the poorer advertisements of the set. At the present time there is no way of estimating which are the good and which are the poor advertisements except on the basis of personal judgment; and when the reviews and criticisms of different advertising men are compared, it is apparent that this personal judgment is today a very variable factor. But this phase of the question is less interesting to the readers of this JOURNAL than the other one, *i. e.*, the value of such work to psychology itself.

The greater part of the experimental work that has been done in psychology has been under the influence of the more or less conscious ideal that we must understand the *simple* mental processes first, and then build up to the complex from this basis by combining known simple processes. With no thought of criticizing this ideal, it is well, however, to face the situation that it is going to be a very long time before, by such a procedure, an analysis can be made as to why A buys Crisco in response to the advertisements which have appeared during the last yéar. In the field of aesthetics we have a similar situation. The "simple" forms, such as squares, rectangles, circles, ellipses, etc., were studied. And then the experimenting practically stopped, for the problem of building from these up to a work of art was too vast to be dealt with. (Of course, general principles have been developed in the study of the

simple which have been carried over and applied to the complex, but, strictly speaking, there has been no extended attempt to build up from the simple to the complex.)

Moreover, we must ask whether a square and an ellipse really are *simpler* psychologically than a simple (that is, uncomplicated) photo or drawing. An immediate response can be made to either ellipse or photo as to whether they are pleasing or not. Both can be "grasped" in one glance and can be reproduced or identified later. It is true that more details will be lacking in the reproduction of the simple photo than of the ellipse, but, on the other hand, it can be more definitely identified later on than can the ellipse. Simpson[1] reports that but 42 per cent. of 25 simple forms could be identified by his group of 17 "good" subjects and 18 per cent. by his "poor" subjects, while 73 per cent. of 25 advertisements can be identified by college students, who were of less ability than his "good" group..[2] Is there any reason, then, why complex physical material may not be used as well as simple physical material as the stimulus for experimental work? Are we justified in declaring the latter produces simple psychical reactions, whereas the former does not, or even that the latter produces simpler reactions than the former? And in any case, is it not worth while to know what the human mind will do in its response to a complex physical stimulus?

With these thoughts in mind the following experiment, made with complex physical material, is presented as showing that such material is consistently reacted to, and that experimental methods can now foretell which advertisement will influence the most individuals.

From a psychological standpoint there are two main problems to be considered in evaluating any advertisement. The advertisement must, first of all, attract attention. Unless it is noticed by the reader it has no value at all. It must, secondly, create a desire for the advertised commodity. Some advertisements have good "attention-value," in that they attract attention to themselves, but they do not influence the

[1] B. R. Simpson. *Correlations of Mental Abilities.* Teachers College. Cont. to Education, No. 53, 1912, p. 37.

[2] E. K. Strong, Jr. *The Effect of Length of Series Upon Recognition Memory.* Psych. Rev., XIX, No. 6, Nov., 1912, p. 459.

reader toward buying—they lack "pulling-power." In making any study of advertisements both of these factors must be considered.

Our experience, based on experiment and introspection, has shown that the two factors—attracting attention and creating desire—must be considered separately. By this it is not meant that the two factors are separate and distinct, and that they each depend on different features of the advertisement—an error into which the bulk of advertising writers have fallen—but that they depend on two different attitudes of the reader. When studying the first factor we must have our subject in a passive attitude toward the material before him and then determine what advertisements catch his attention, *i. e.*, arouse him so that he stops and looks at them, in contradistinction to the remaining advertisements. Psychologically stated, we have involved here the factors of perception and passive or primary attention. But when studying the second factor—that of creating desire—we have to have our subject in an active attitude. At least, we do have him in such a condition as soon as the experiment is started. And because that is so, we cannot then determine which advertisements would have attracted him while in a passive "don't-care" attitude. It is because of this situation that the two separate tests—one for "attention-value" and the other for "pulling-power"—have been developed.

A concrete example will make this matter clearer. Mr. F. R. Davis of the General Electric Co. supplied the writer sometime ago with five tungsten lamp advertisements, together with the detailed results that the company obtained from them. Only three of the five will be considered here, as the other two were quite different in one respect from these three. This difference so noticeably affected the company's data that no real comparison can be made between the actual returns of the two advertisements and those of the three. For the sake of simplicity, therefore, the two will not be used here.

The relative attention-value of the three advertisements can be expressed by the following figures:

Advertisement	A,	attention-value	1.88 P. E. 0.17
"	B,	"	1.80 P. E. 0.16
"	C,	"	2.25 P. E. 0.14

The figures represent the relative order of effectiveness in attracting attention. If A had been first in every case, it would have been ranked "1.00"; if B had been second in every case, it would have been ranked "2.00," and if C had been third in every case, it would have been ranked "3.00." But the three advertisements did not have these three positions in every case. A and B are practically tied at 1.8, and C stands at 2.3. The probable errors (P. E.) indicate that there is no true difference between A and B, but that both are decidedly superior to C.

The method used in obtaining these results was as follows: The advertisements were laid face up on a table in such a way

ELECTRIC LIGHT IS NOW CHEAPER
YOU can have a flood of beautiful, healthful Electric Light at ½ the old cost by using
General Electric
TUNGSTEN LAMPS
The last argument of gas and oil is gone. They can no longer offer even the claim of economy. With G.E. Tungsten lamps electric light becomes at once a greater luxury and also much cheaper. The new filament in this lamp—its distinctive feature—produces a wealth of beautiful, clear, white light with less than half the electricity required by old style incandescent lamps of equal candlepower.
An International Achievement
Some Questions Answered
General Electric Company, Dept. 38, Schenectady, N.Y.
The Largest Electrical Manufacturer in the World

ADVERTISEMENT A.

Electric Light is Now Cheaper
At one sweep the cost of Electric Light has been cut in two by the invention of a new lamp which fits any electric light socket
General Electric
TUNGSTEN LAMP
A night picture of Madison Square Garden, New York, during the recent Electric Show—the most beautiful example of Electric Lighting ever seen. The General Electric Tungsten Lamp was used exclusively—the highest tribute to the Electric Lighting World.
Ask your Electric Light Company about this new lamp tomorrow morning. Find out why it is so economical. Learn how you can now have Electric Light at one-half the old cost. When you have these new facts you will plan to use Electricity immediately.
Here is the lamp and the carton it comes in. Accept only the genuine General Electric Tungsten Lamp. The G.E. monogram on box and lamp is its guarantee.
This lamp has a new metal filament which uses less than half the Electricity used in old style lamps of equal candle power. It burns at any angle and has an average life of one year or 800 hours' use.
Standard Sizes—Watts Used 25 40 60 100 250
(Candlepower is four-fifths mean watts used)
G.E. 25 Candle 40 Watt Tungsten Lamp
TUNGSTEN
40
WATTS
115
VOLTS
(Valuable Information on Electric Lighting is given in G.E. Tungsten Booklet No. 35. Write us for it.)
General Electric Company, Dept. 35, Schenectady, N. Y.
The Largest Electrical Manufacturer in the World

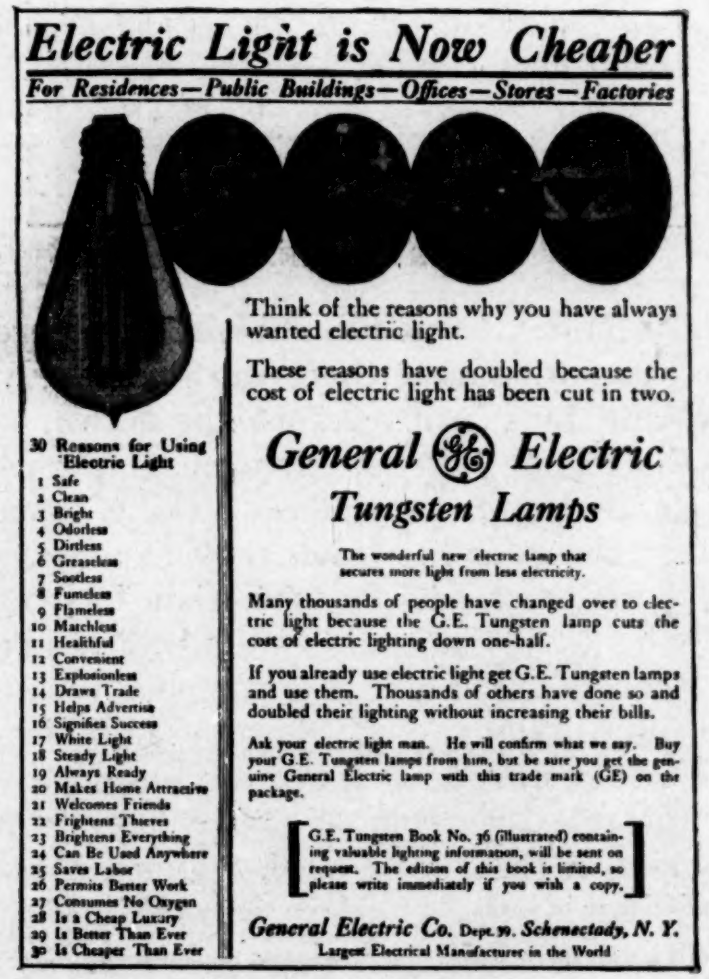
ADVERTISEMENT B.

that they were hidden from the subject by a screen. It was explained to the subject that there were three advertisements on the table, and that in a moment the screen would be removed; that he was to take one general glance at all the advertisements and then to commence picking them up as fast as he could in the order in which they caught his attention. Two points were emphasized—first, that he was simply to glance at all the advertisements for only a moment; second, that he was then immediately to commence picking them up, and must continue doing so until they were all picked up. The order in which they were picked up was recorded. This order represented the relative order of "attention-value" of these advertisements for that individual. This order differs for different individuals; some orders so obtained are found to be nearly the reverse of other orders.

"Attention-value" depends on the relationship of the de-

tails in an advertisement to the past experience of the reader. The firm name may have no attention-value for 99 per cent. of readers, but have tremendous attention-value for 1 per cent. simply because it is their family name. And so with other details. Ordinarily speaking, an advertisement commands our attention because it has in it some detail or details that are familiar and interesting; in very exceptional cases, because it concerns a strikingly unknown object. No distinction is made in this test between attention-value depending upon relevant or irrelevant details in the advertisement. The former is, of course, superior, but I believe the difference between the two is measured in the experiment on pulling-power, described below, and so need not concern us here.

Two precautions are always taken in this test. The advertisements are rotated in position on the table as they are suc-


Electric Light is Now Cheaper
For Residences—Public Buildings—Offices—Stores—Factories
30 Reasons for Using Electric Light
1 Safe
2 Clean
3 Bright
4 Odorless
5 Dirtless
6 Greaseless
7 Sootless
8 Fumeless
9 Flameless
10 Matchless
11 Healthful
12 Convenient
13 Explosionless
14 Draws Trade
15 Helps Advertise
16 Signifies Success
17 White Light
18 Steady Light
19 Always Ready
20 Makes Home Attractive
21 Welcomes Friends
22 Frightens Thieves
23 Brightens Everything
24 Can Be Used Anywhere
25 Saves Labor
26 Permits Better Work
27 Consumes No Oxygen
28 Is a Cheap Luxury
29 Is Better Than Ever
30 Is Cheaper Than Ever
Think of the reasons why you have always wanted electric light.
These reasons have doubled because the cost of electric light has been cut in two.
General Electric
Tungsten Lamps
The wonderful new electric lamp that secures more light from less electricity.
Many thousands of people have changed over to electric light because the G.E. Tungsten lamp cuts the cost of electric lighting down one-half.
If you already use electric light get G.E. Tungsten lamps and use them. Thousands of others have done so and doubled their lighting without increasing their bills.
Ask your electric light man. He will confirm what we say. Buy your G.E. Tungsten lamps from him, but be sure you get the genuine General Electric lamp with this trade mark (GE) on the package.
G.E. Tungsten Book No. 36 (illustrated) containing valuable lighting information, will be sent on request. The edition of this book is limited, so please write immediately if you wish a copy.
General Electric Co. Dept. 39. Schenectady, N. Y.
Largest Electrical Manufacturer in the World

ADVERTISEMENT C.

cessively exposed, in order to equalize any difference due to position. Second, the advertisements are not shown to the subject before the experiment—they are relatively unfamiliar to him at the time of the test.[3]

From the order in which the advertisements were picked up by the various subjects an average or median may be readily obtained. This central tendency represents the final finding of the test. Medians seem much preferable to averages in this work, and are used here. They are expressed in the figures above.

Having obtained the relative "attention-value," the next step was to determine the relative convincingness or "pulling-power" of the advertisements. The directions, as employed in the test with the General Electric Co. advertisements, were as follows:

"Arrange these advertisements in the order in which *you would buy* the Tungsten lamps.

"Take for granted that each advertisement represents a different make of lamp, that is, one is a Western Electric, one a General Electric, etc."

The second paragraph heads off a great many questions, and was used simply and solely for that purpose. In other words, it makes the work more natural and real. When the arrangement was completed, the second part of the directions was presented to the subject. It was as follows:

"When you have completed your arrangement, give each advertisement a grade on a scale from 100 to 0. 100 should represent that grade you would give an advertisement which appeals so strongly as to irresistibly force you to buy the article. 0 should represent that grade you would give an advertisement that had no appeal for you at all, i. e., had no effect on you."

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[3]H. L. Hollingworth first applied this procedure in this connection. It is recorded in the writer's monograph, *The Relative Merit of Advertisements*, Archives of Psychol., No. 17, 1911, p. 11, and more fully considered in an article in Advertising and Selling, Dec., 1911. R. M. Yerkes has also used the same procedure. See *The Class Experiment in Psychology with Advertisements as Materials*, J. Ed. Psychol., III, No. 1, Jan., 1912. The writer now prefers a recognition memory test instead of this one. But a comparison of the two methods has not as yet been made, nor can we be sure that either is adequate. For a partial description of the latter method, although presented for another purpose, see the writer's recent article on recognition memory, *op. cit.*

This grading of the advertisements was first adopted in order to gain some idea of whether the advertisements did or did not appeal to the subject, and also the *amount* of difference in the appeals of each separate advertisement. The writer has found that the data from these grades can be used as instructively as the data from the arrangements. Advertisements that are distasteful or antagonistic, or that prejudice

TABLE I. *Showing "Pulling-Power" of the Three General Electric Company's Advertisements.*

Subjects.	Data Based on Order of Merit. Advertisements.			Data Based on Grades Assigned Each Advertisement. Advertisements.		
	A	B	C	A	B	C
1.	3	1	2	50	100	85
2.	3	1	2	40	85	80
3.	1	2	3	100	50	25
4.	1	3	2	50	15	40
5.	3	2	1	45	85	90
6.	1	3	2	75	25	50
7.	1	3	2	50	25	45
8.	1½	3	1½	50	30	50
9.	1½	3	1½	85	70	85
10.	3	2	1	45	50	75
11.	2	3	1	60	0	70
12.	2	3	1	85	60	87
13.	1	3	2	83	78	80
14.	2	3	1	65	15	75
15.	2	3	1	80	35	90
16.	3	2	1	50	70	75
17.	2	1	3	80	100	60
18.	1	3	2	70	50	60
19.	2	3	1	75	70	90
20.	2	3	1	40	0	80
21.	2	3	1	80	38	100
22.	3	1	2	50	100	75
23.	3	1	2	50	90	80
24.	1	3	2	90	50	60
25.	1	3	2	80	10	40
26.	2	3	1	65	0	80
27.	1	3	2	70	25	60
28.	1	2	3	90	70	0
29.	3	2	1	50	80	95
30.	2½	1	2½	25	30	25
31.	1	3	2	85	60	75
32.	1	2	3	100	40	20
33.	1	2	3	90	75	0
34.	2	1	3	25	85	15
35.	1	3	2	70	10	40
36.	2	3	1	85	75	95
Median	1.74	2.64	1.76	69.2	52.5	73.5
P. E.	.10	.09	.09	2.8	4.4	3.3

one against the advertised article, are, of course, to be graded below 0. Very few such cases occur with men, but they are quite frequent with women.

In a good many cases the subject will revise his order of arrangement when forced to grade the advertisements. The revised order is preferable, because the act of grading the advertisements seemingly forces greater concentration upon the work, and the subject tends to forget that it is only an experiment and to act more as he would if actually confronted with the situation.[4]

Table I presents the results from 36 subjects respecting the relative "pulling-power" or persuasiveness of the three General Electric advertisements. The individual results are given, as they afford an opportunity to compare the data from the two separate methods of measuring "pulling-power." The first three columns of the table give the respective orders of arrangement of the 36 subjects, and the last three columns give the respective ratings of the same subjects. Subjects 1 to 24 are men, and 25 to 36 are women. The medians of the six columns are given together, with their probable errors. From the medians of the first three columns we must conclude that advertisements A and C are about equal in value, with the advantage in favor of A, and that B is very much inferior to the other two. From the medians of the last three columns we likewise must conclude that A and C are about equal in value, but that here the advantage is reversed, being somewhat in favor of C. B is here again decidedly inferior to the other two. (The two systems of recording results are sometimes puzzling to the uninitiated. But if it is borne in mind that in the first three columns—where an order of merit is obtained—the smaller the figure the better is the advertisement, because it is ranked more nearly first, *i. e.*, "1.00," and that in the last three columns—where a percentage of perfection is recorded—the larger the figure, the better is the advertisement, because it is ranked then more nearly 100 per cent., the meaning of the figures will be clear.) We should conclude from the two sets

[4]For a more detailed description of this test for pulling-power, see *Application of the "Order of Merit" Method to Advertising*, J. Philos., Psychol., and Sci. Methods, VIII, 22, Oct. 26, 1911, and the writer's monograph, *op. cit.*

of data that advertisements A and C are practically equal in "pulling-power," while B is decidedly inferior.

We now have the following results:

Advertisements A and B are equal in "attention-value"; C is inferior.

Advertisements A and C are equal in "pulling-power"; B is inferior.

We must undoubtedly conclude, then, that A is the most efficient of the three. How to equate the other two properly is still unknown. The relationship of the "attention-value" test to the "pulling-power" test can only be solved after much more work has been done. At present the indications from a number of tests lead the writer to place very much more emphasis upon the "pulling-power" than upon the "attention-value" test. He would then conclude in this particular case that C is only a little less efficient than A, while B is considerably inferior. In other words, he follows the "pulling-power" test and modifies its results only slightly in accordance with the results of the "attention-value" test. (The "pulling-power" test will ordinarily correlate very highly with the actual results, while the "attention-value" test does not necessarily show high correlation.)

The *actual results* from these three advertisements as supplied by Mr. F. R. Davis of the General Electric Co. show that advertisements A and C were about equal in value, although A was the superior of the two, and that both advertisements were very much superior to B. Efficiency ratios of the three advertisements in terms of A were as follows: 100 for A, 52 for B and 93 for C.

These experiments show, then, an order of efficiency of the three advertisements and give some idea as to the amount of difference in efficiency between the various advertisements. This order of efficiency agrees with the order obtained in actual business. All the experiments so far conducted have resulted in quite close agreement between the experimental results and the business returns.

What we need now is methods which will give not simply an *order of merit,* but some fairly definite idea as to the *amount* of business each advertisement will bring in in terms

of any one of them. The methods of grading advertisements after they have been arranged in an order of merit (see the second three columns of Table I) appears to be a step in this desired direction. If the medians—69.2 for A, 52.5 for B and 73.5 for C—are divided by 69.2 to reduce them all to ratios in terms of A, we have the following ratios: 100 for A, 76 for B and 106 for C.[5]

These ratios do not agree very closely with those supplied by the General Electric Co. But the experimental ratios are only based on the "pulling-power" factor, and do not take into account the "attention-value" factor. The poor "attention-value" of C would bring down the ratio as given above, making the experimental ratio more nearly in accord with the actual ratio; but, on the other hand, the good "attention-value" of B would raise the experimental ratio, making it still higher than the actual value would lead us to expect.

What we have obtained in this experiment is this: We have determined experimentally that advertisements A and C are about equal in efficiency, with the advantage in favor of A, and we have determined that B is very much inferior. Our knowledge of the results obtained from these advertisements in actual business shows that our analysis is correct. Our attempt, however, to state the experimental findings in efficiency ratios has not been so accurate as we should like. Further work must be done before we can be confident of such results. Nevertheless, the grades do point out clearly that A and C are about equal, and that B is very much less efficient, which is the actual situation.

No attempt was made in this particular experiment to determine *why* A and C were about equal in creating desire for the lamps and why B was inferior to them in this respect. The *why* is a different problem from the *what*, and seemingly much more difficult to handle.[6]

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[5] If the averages had been used instead of the medians, the experimental ratios would have been 100 for A, 78 for B and 95 for C. These ratios agree very much better with the actual ratios than do those obtained from the medians. But in the majority of cases the median has given more valid results than has the average.

[6] See R. M. Yerkes' article, *op. cit.*, for one attempt to analyze the cause of an advertisement's effectiveness.

Introspection has often given very valuable hints as to the *why,* and the writer employs it ordinarily in all his work. But at best, he has never felt that it gave more than simple suggestions as to the real cause of the subject's attitude toward the advertisement. In the vast majority of cases nothing of value has been obtained and no true introspections appeared. Well-trained psychologists, who emphasize introspection in their writings, when acting as subjects for the writer have failed in this case to give introspections which they considered of any value at all.

A good many psychologists hold that the work represented in this article is not psychological, in that it does not analyze the mental processes involved. The writer feels that, if this is the case, Ebbinghaus' study of the fading of memory also cannot be deemed psychological, as it gives only the results of mental processes, but does not explain them. But surely the facts concerning memory given us by Ebbinghaus in his curve have been of tremendous value in later analyses of the process itself. Is not the situation the same here? When once we *know* that A is superior to B, then we can intelligently attempt to explain the cause; but before we know this result of mental work we cannot attempt an explanation of causes of any sort. It is with this idea in mind that the writer holds to the belief that what has been presented is within the psychological realm. But it is only one step toward a complete understanding of the whole situation, and many more steps are necessary before the end can be reached.

CORRELATION OF ABILITIES AS AFFECTED BY PRACTICE.

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Attempts to intercorrelate mental or motor abilities as measured by laboratory tests have usually produced more or less irregular results. Some of the coefficients have been positive, some negative, but in few cases have many of them been large when the individuals tested have been chosen at random or with no deliberate intention of measuring only the extremes of the curve of distribution. Thus Pyle, in a recent report of correlations of abilities among several hundred adult individuals, remarks that a certain test for logical memory is "one of the very best tests" partly because of "its high correlation with other tests", an average correlation of .29.[1]

Two reasons are largely responsible for these low coefficients. The first is the fact that the measures correlated have usually been initial trials or at most averages of a very few trials. This means great individual variability, and considerable consequent attenuation which must in some way be corrected for. A more important factor, perhaps, is the fact that these preliminary trials do not necessarily represent the final capacities of the individuals. They are determined by a host of incidental or accidental influences and reveal only momentary ability, not ultimate capacity. Thorndike has shown[2] that there is every reason for finding "desirable traits" to be positively correlated, and we may well expect to find this in-

[1]Jour. Ed. Psych., Feb., 1913, p. 63.

[2]Educational Psychology, p. 184.

creasingly true the more our measures test the final limits of capacity in the various tests. In other words, the only real correction for attenuation is by continuing the test until the individual has reached the limit of practice in the test.

Only occasional attempts have been made to determine the influence of practice on the correlation of abilities, and those that have been reported have been based on so few practice trials that no review of them need be given at this point. The present study presents the results of an experiment in which a group of observers were repeatedly tested until in each test a practice limit was reached, a limit which 100 further trials failed to improve. Such questions as the following are at once suggested.

1—What is the effect of practice on the correlation of specific abilities?

2—What factors are responsible for this effect?

3—What is the significance of the finding?

In the experiments here reported, six familiar laboratory tests have been repeated 205 times by each of 13 observers. The tests were *Adding, Color Naming, Opposites, Discrimination Reaction to Colors, Coordination* (three hole test) and *Tapping.*[3] On 32 days 5 trials were made daily, at intervals of about two hours. On each of the remaining 3 days 15 trials were made, at intervals of about 45 minutes.

Each test has been correlated with all of the remaining tests, at various points in the curve of practice. These points, and the measures representing them, are as follows:

1—Preliminary trial	designated as	1st trial
2—Median of first 5 trials	" "	5th trial
3—Median of trials 20 to 25	" "	25th trial
4—Median of trials 75 to 80	" "	80th trial
5—Median of trials 200 to 205	" "	205th trial

[3]A full account of the character and technique of these tests is to be found in the writer's "The Influence of Caffein on Efficiency."

TABLE I.

Showing the Correlation of each Test with every other, at various points in the Curve of Practice.

	Trial.	Tapping.	Co-ordination.	Discrimination.	Color Naming.	Opposites.	Adding.	Average.
	1	.45	—.21	.23	.26	.23		.19
	5	.55	.32	.44	—.03	.17		.41
Adding	25	.49	.22	.33	.91	.57		.50
	80	.55	.19	.52	.85	.63		.55
	205	.57	.16	.15	.76	.76		.48
	1	.36	—.14	—.46	.53		.23	.10
	5	.26	—.17	.39	.66		.17	.26
Opposites	25	.49	—.14	.27	.54		.57	.35
	80	.33	.27	.26	.68		.63	.43
	205	.55	.50	.39	.88		.76	.62
	1	.36	—.28	—.13		.53	.26	.15
Color-	5	—.03	—.19	.36		.66	—.03	.15
Naming	25	.29	—.03	.43		.54	.91	.43
	80	.28	.28	.54		.68	.85	.53
	205	.52	.47	.41		.88	.76	.61
	1	—.08	.11		—.13	—.46	.23	—.07
Discrim-	5	.33	.23		.36	.39	.44	.35
ination	25	.35	—.05		.43	.27	.33	.27
	80	.30	—.08		.54	.26	.52	.31
	205	.59	.19		.41	.39	.15	.35
	1	—.25		.11	—.28	—.14	—.21	—.15
Coordin-	5	.50		.23	—.19	—.17	.32	.21
ation	25	.13		—.05	—.03	—.14	.22	.03
	80	.26		—.08	.28	.27	.19	.18
	205	.39		.19	.47	.50	.16	.34
	1		—.25	—.08	.36	.36	.45	.17
	5		.50	.33	—.03	.26	.55	.32
Tapping	25		.13	.25	.29	.49	.49	.35
	80		.26	.30	.28	.33	.55	.34
	205		.39	.59	.52	.55	.57	.52

TABLE II.

Showing the Average Correlation of each Test with all others, at various points in the Curve of Practice.

Trial.	Adding.	Opposites.	Color Naming.	Discrimination.	Co-ordination.	Tapping.	Final Averages.
1	.19	.10	.15	—.07	—.15	.17	.065
5	.41	.26	.15	.35	.21	.32	.280
25	.50	.35	.43	.27	.03	.35	.320
80	.55	.43	.53	.31	.18	.34	.390
205	.48	.62	.61	.35	.34	.52	.490

At each of these points the 13 individuals were arranged in an order of relative ability for each of the 6 tests, and these orders correlated by the formula $r = 1 - \frac{6\Sigma d^2}{n(n^2-1)}$. Table I gives the correlations in detail, of each test with every other, for the five points on the curve of practice. Table II gives, for each test, at each point, the average correlation with all the other tests, and also the grand average correlations of all tests.

Except in the case of *Discrimination Time* the effect of practice is to increase, to a marked degree, the intercorrelations of the various tests. Considering the averages in Table II, *Adding* increases steadily up to the 80th trial. *Opposites* and *Color Naming* gain even more steadily to the very end of the experiment, the increase in the coefficients being four to six fold. *Tapping* increases more slowly but no less certainly. In *Coordination* the increase is very irregular, but the coefficients show, on the whole, a change from —.15 at 1st trial to .34 at the finish. Only in the case of *Discrimination Time* is there failure to increase after the 5th trial. The coefficients here remain fairly constant, dropping slightly in the early middle of the experiment.

But in no case, after the preliminary trial, is there a negative coefficient among the average correlations, and indeed, in only one case is there a coefficient smaller than .15. The final grand averages show steady increase from .065 in the preliminary to .28 at the 5th, .32 at the 25th, .39 at the 80th

and .49 at the 205th trials. *With practice, then, the average correlations of all tests become positive, and the coefficients become greater the longer the practice is continued.*

If reference be now made to Table I the details of this increase may be made out. The increase is not present with every combination of tests. The following points are to be noted.

Adding,—The coefficients with *Tapping, Color Naming* and *Opposites* increase, those with *Coordination* decrease, and those with *Discrimination* vary irregularly.

Color Naming,—There is clear increase of all coefficients, but the maximum is reached quite early except with *Tapping* and *Coordination*.

Discrimination,—fails to show increasing correlation as the result of practice beyond the first trial. Except for a very high coefficient with *Tapping* in the 205th trial there would indeed be a general tendency toward loss rather than toward gain.

Coordination,—shows much the same tendency as *Discrimination*. Beyond the 5th trial there is on the average a loss, which is recovered only by the last trial, as a result of high correlation with *Color Naming* and *Opposites*. In the other cases the coefficients decrease.

Tapping,—beyond the 5th trial makes clear gains only with *Opposites* and *Color Naming*. The remaining coefficients either remain fairly constant (*Adding*) or decline (*Coordination*) or make clear gains only by the end of the experiment (*Discrimination*).

In producing this general increase in the correlation of specific abilities through the medium of practice, at least three different factors probably cooperate.

A—*Variability of Performance*. In the beginning of the experiment each individual is more variable than at later points in the curve. This momentary variability need not be supposed to affect all the tests in the same way nor all individuals in the same direction. This fact will then tend to reduce the correlation of the preliminary trials to a considerable degree and will in some cases materially affect the first five to ten trials. Beyond the 25th trial the variability in these tests is much reduced, and particularly so in the measures here used, which are in all cases, after the preliminary trial, the medians of five successive records.

B—*Changes in the Character of the Tests Themselves*. It is quite probable that, with many observers, the *Opposites* test, for example, comes, after many repetitions, to resemble more and more that type of process or function involved in *Color Naming*. The responses become more and more inti-

mately associated with the stimulus words, the suggested responses to each word become more and more limited in number and in most cases reduced to a single word for each stimulus. This is true, in *Color Naming*, at the very beginning. As the order of the stimulus words is changed at each trial, the test may come more and more to involve merely the quickest possible association of the right response, and the overcoming of inhibitions and interferences of a more or less general sort, and less and less of the element of selection. Much the same thing may also be true of the *Adding* test. It is in these three tests that the increase in correlation is most marked, and the actual coefficients highest at the end of the experiment. Careful analysis of what takes place as one improves in these simple tests would no doubt yield interesting material.

But these two factors, decrease in variability and change in the character of the tests, seem to the writer to be far from sufficient to account for the results. The *Tapping* test remains very much the same type of process throughout, the only apparent modifications being in slight changes in method and perhaps some gradual change in the muscles. There is certainly no reason to suspect that *Tapping* and *Opposites* or *Tapping* and *Discrimination* become, as tests, more alike because of frequent repetition. But the increase in correlation is clear in both these cases. Again, it is well established that the discrimination reaction, in the form here used, also tends to become reflex through practice, the conscious discrimination coming only after the correct reaction has been made. These experiments called for between 3075 and 4100 single discrimination reactions on the part of each observer, which would afford ample time for such a change to show itself. Mere change in the character of the test would then lead us to expect *Color Naming, Opposites,* and *Adding* to come more and more to resemble *Discrimination* Reaction. But they do not, if the coefficients may be taken as evidence. The coefficients of these tests with *Discrimination* show no tendency to increase, even by the end of the experiment. Further, there is clear increase in correlation between *Coordination* and *Color Naming,* and between *Coordination* and *Opposites.* The assumption of increasing similarity in the character of these pairs of tests

would seem rather gratuitous. Moreover, if there were such an increase in similarity, and this be also supposed to account for the higher correlation of *Color Naming* and *Opposites* with *Adding, Coordination* and *Adding* should show the same increase in correlation. Just the reverse is actually the case, the correlation of *Coordination* with *Adding* decreasing consistently.

C—*"General Ability."* Some further factor must then be responsible for the general increase in correlation, aside from decrease in variability (which affects only the first few trials) and progressive qualitative approximation of the tests (which is seen to be inadequate). The so called "general ability" of Spearman and others at once suggests itself in this connection. If there is such a thing as "general ability" or "general intelligence" we should expect all samplings of that ability to correlate more and more the more the measures came to be "true samplings." We might indeed expect to find evidences of this general ability only when measuring the "ultimate capacity" of the individuals concerned. The momentary ability revealed in initial trials, or even in the first half dozen trials in a given set of tests might well be expected to show only low degrees of correlation. These would not be measures of ultimate capacity, but would be highly determined by previous practice, chance variability, momentary attitude and initial method of attack. They would, in short, be samplings only of momentary ability, not of final capacity.

Or if the "common factor" of Spearman be rejected, the present evidence tends strongly to support Thorndike's conclusion concerning the "positive correlation between desirable mental functions." Some form of the doctrine of "general ability" at any rate, seems to be made out. But the conclusion seems to call for the qualification that "general ability" have reference to final capacity rather than to momentary performance, if the correlation is to be high. Give each individual the opportunity to attain his limit of efficiency, his highest level

of performance, and when these final limits are reached individuals who excel their fellows in one type of work will also excel in other types of work.

The theory and practice of tests has in the past been too content to rest its claims on the meagre results of a few preliminary samplings of an individual's ability. The fact that even when a great variety of such samplings of a given individual are aggregated and balanced off against each other few results of real diagnostic value are achieved should be sufficient warning against this tendency. We have above all failed to make sufficient allowance for the overwhelming importance of incentive, motive, attitude and purpose and the large role they play in determining the possible achievements of a nervous system. It is well enough to test the memory span and attention type of an applicant for a job as motor-man on a street car. It is still more important to learn the strength of his instinctive competitive reactions, to measure the intensity of his belief in hell or in socialism, or of his intention to effect the higher education of his children. And by "more important" I mean better calculated to reveal his fitness for the work. I would rather trust my life and limb to a motor-man whose feeble memory span is reinforced by an intense devotion to the comfort of his grandmother than to a mnemonic prodigy whose chief actuating motive in life is to be "a good fellow."

I do not wish to underestimate the usefulness of the simple preliminary test as a means of detecting extreme departures from the mode,—such departures as idiocy, retardation, etc. The use of preliminary tests in such cases has been amply justified by experience with them. I am primarily interested, at this point, in the determination of individual differences within the large middle range of the curve of distribution. My conviction is that for this purpose we shall find it necessary to determine the individual's "limit of practice" in the various tests before we shall secure diagnostic results which

will be verified by the individual's subsequent achievement in daily life.*

Professor Thorndike has recently taken occasion to prophesy the important results in the way of educational diagnosis which will come when we know still more about mental tests than we now do. His conservative and well supported prophesy is given by way of a safe argument "that the results of the study of mental tests are beginning to be important for education and the other arts of social control of human nature." It is significant that most of the tests included in his suggested list are such as, in the experience of the writer at least, show fairly high correlation between the records of the first half dozen trials and final capacity after practice. We should know much more than we do about the tendency

*Just as this paper was going to press Professor Whipple called my attention to a conclusion stated by Cyril Burt in his paper, "Experimental Tests of General Intelligence" (*Brit. Jour. of Psychol.*, 1909, pp. 94-177). Burt states that with one or two exceptions the correlations of test records with general estimates of intelligence "is highest on the first occasion, that is, when the task is newest." Spearman, in a letter to Burt, writes: "I have found over and over again that practise may greatly increase tendencies to correlate." Burt, however, takes Spearman to mean "practise during the same sitting," and concludes, on the basis of his own data, that "practise in successive sittings seems to have the reverse effect on intelligence correlations in tests where procedure is readily grasped" (p. 123).

This conclusion of Burt's, if stated as a generalization, does not seem to me to be warranted by his data. Two or three trials can hardly be dignified by the name "practise," at least in the sense in which that word is used in the present connection (approximation to limit of ability). In the one test in which more than three trials were made (Spot Pattern, 6 trials) Burt finds progressive increase in correlation, the successive coefficients being 19, 57, 58, 69, 64, 41. Indeed, in one-fourth of the total number of cases, taking only the first two trials, the second coefficient is higher than the first; further, comparing the second and third trials, in the 9 cases in which three trials are available, the third is higher than the second in two-thirds of the cases.

If Burt's conclusion, in its generalized form, were correct, one would be curious to know why practise, while increasing the intercorrelation of tests, should decrease their correlation with general estimates of intelligence. But the generalization can probably not be made. Burt himself, in an earlier paragraph, remarks: "The result of special practise in the experimental tests * * * would only be to convert a measurement of a special mental process at its first appearance into a measurement of that process at its maximum efficiency, and as this must form a far truer measurement of that process itself, it presumably would also form a superior test of the intelligence correlated with it" (p. 103).

A useful extension of Burt's interesting experiments might well be made by correlating practise limits with general impressions of intelligence. In a forthcoming paper I shall show that preliminary trials in tests do not reveal the final relative abilities of the individuals as determined by their practise limits in the same tests.

and meaning of such correlations, particularly if we wish to extend the method of tests beyond educational diagnosis and use them as means of vocational guidance or of industrial selection. For educational diagnosis we wish primarily to learn what kind of practice the individual needs most. For vocational and industrial purposes we need rather to know what limits the individual can reach, in given kinds of per formance, as the result of practice, and to what degree his present equipment of incentive renders probable the actual achievement of this limit.

It is quite probable that further advance in this direction will come, not from the elaboration or invention of more tests, but by the selection of a very few tests, and the examination of the final limits of practice with respect to them. The practical problem will then be,—

1—The selection of sets of tests in which initial performance shows high correlation with ultimate capacity in the tests themselves, or else the laborious and undramatic but perhaps preferable alternative of continuing every test until practice limit is reached by the individual. In the latter case it would be well to know more about the nature and range of these limits than we now know.

2—Correlation of these tests with the particular aptnesses or fitnesses toward the detection of which diagnosis may be directed.

This is a hard and arduous program. It calls for strenuous work on the part of the investigator, patience and faithfulness on the part of observers, and wide cooperation of investigators with each other. From the immediately practical point of view it also offers an inviting opportunity to those foundations and individuals who are interested in supporting the further development of "the arts of social control over human nature."

CORRELATIONS AMONG ABILITIES IN SCHOOL STUDIES.

DANIEL STARCH,

University of Wisconsin.

The present status of the problem of correlation among mental functions may be summarized by saying that mental traits seem to be highly specialized; that they vary apparently quite independently of one another, or, in short, that correlations are surprisingly low, even among traits which on superficial observation would seem to be highly correlated.

A very serious criticism of the work in this field is that coefficients of correlation have been based on extremely inaccurate measurements. A considerable share of the data employed consist of tests made upon large groups of persons simultaneously and perhaps only once. Lack of conscientiousness, distracting influences, unfavorable mental and physical conditions of the subjects, misunderstanding of directions, and the like, have vitiated to a considerable extent the results of such group tests. Furthermore, almost any mental test, even if made carefully and under scientific conditions, but if made only once, is still a rather crude measurement of a given person's real ability in that respect. For example, if you test the memory span for words of a given person on successive days you may obtain a series of measurements about as follows: 6, 5, 6, 7, 5, etc. It is obvious that the average of these measurements represents much more correctly the real memory span of that person than any individual measurement does.

Now, it has been shown by Spearman,[1] in 1904, that inaccu-

[1] C. SPEARMAN. *General Intelligence Objectively Determined and Measured.* Amer. Journal of Psych., 15, 1904, 201-292.

rate measurements tend to reduce the coefficient from its true value toward zero. It is obvious that the coefficients calculated from meager and incomplete measurements must be of doubtful value. The field of correlations will have to be worked over again, and computations will have to be made on more complete and more adequate tests. Some coefficients will be very much higher than they are assumed to be at present, while others may not be very different.

Besides tests on special abilities, the chief source of data has been the marks in school studies. Special interest has centered upon these because of the practical importance of determining the correlation among abilities in school studies. Numerous coefficients have been computed on the basis of marks, but in many instances it is not clear how extensive the marks were, or whether they had been assigned by one or by several teachers.

There are two reasons why coefficients based on marks have been particularly untrustworthy. One is that marks, as shown by recent investigations,[2] are exceedingly unreliable measures. For example, it has been found that marks of the same paper, assigned by teachers of the subject in the same institution, have an average variation of about 5 points on a scale of 0 to 100. The other reason is that a given pupil may have a high mark in one study and a low one in another, not because of so much divergence of ability, but because of difference in interest and effort on the part of the pupil. At another time the same pupil may do as well in the one study as in the other, because of equal interest and effort as well as equal ability.

In order to minimize the effect of inaccuracy in marks, difference in interest and effort, difference among teachers, and the like, I obtained the marks of the same pupils in the fifth, sixth, seventh and eighth grades in two schools in Madison. There were 24 pupils in these two schools who had a continuous record for these four years. From these marks an average for each pupil in each study was computed. A similar calculation was made for 40 pupils who had a continuous record

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[2]D. STARCH AND E. C. ELLIOTT. *Reliability of Grading High School Work in English.* School Review, 20, 1912, 442-457.

for the sixth, seventh and eighth grades in the same two schools.

These averages were then used for calculating, by Pearson's rank method, the coefficients of correlation given in Table II. The coefficients in the first column are based on the records of the 40 pupils, and those in the second column are based on the records of the 24 pupils. The latter are the more reliable coefficients. The averages for history are based on the marks in the seventh and eighth grades, since history is taught only in these two grades. Likewise, the averages for geography are based on the marks in the sixth and seventh grades in case of the 40 pupils, and on the marks in the fifth, sixth and seventh grades in case of the 24 pupils, because geography is not taught in the eighth grade. Four coefficients are based on the records of 22 pupils only, geography and history, history and reading, history and spelling, and reading and spelling (first column).

To show how much variation there is in marks obtained from year to year by the same pupils in the same studies, notice the figures in Table I. This table gives the marks of five pupils in arithmetic in the upper four grades.

TABLE I.

Grades.	A	B	C	D	E
5	87	79	70	78	80
6	84	70	76	82	74
7	87	86	84	81	76
8	94	88	79	82	74

TABLE II.

Arithmetic and language	.73	.85
Arithmetic and geography	.74	.83
Arithmetic and history	.73	...
Arithmetic and reading	.45	.67
Arithmetic and spelling	.42	.55
Language and geography	.86	.85
Language and history	.77	...
Language and reading	.80	.83
Language and spelling	.77	.71
Geography and history	.81	...
Geography and reading	.83	.80
Geography and spelling	.68	.52
History and reading	.67	...
History and spelling	.37	...
Reading and spelling	.72	.58

The most striking fact brought out by these figures is that the coefficients are very much higher than they have generally been assumed to be. Thorndike quotes,[3] for grammar-school subjects, a coefficient of .39 for English and mathematics, .36 for geography and mathematics and .43 for English and geography, as compared with .85, .83 and .85, respectively, for the same subjects in Table II, second column. The coefficients for subjects taught in high schools and colleges as given by Thorndike are approximately .40 to .50.

Second, the high coefficients in Table II are due to the much greater accuracy of the data upon which they were computed. If we calculate coefficients from marks for any single year, we obtain coefficients which are no higher than those usually quoted. I have done this in several instances and obtained a coefficient of .41 between arithmetic and language, .40 between arithmetic and history and .53 between language and history.

The third point of interest is that spelling has a lower correlation than any other study; reading is next, while the other four studies—arithmetic, geography, history and language—have approximately the same high degree of correlation among themselves. The low correlation of spelling is very likely due to the fact that it is so largely dependent upon illogical, or pure unaided, retentiveness, while the other studies are more dependent upon reasoning, logical memory and divers associations.

In conclusion, it would seem that mental functions are not as minutely specialized as has recently been assumed. It is quite probable that there are certain large groups of functions which are very closely correlated among themselves, but which may not be very closely correlated with functions of other groups. At any rate, it is highly imperative that the entire field of correlations should be gone over again by making more accurate and more complete measurements.

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[3] E. L. THORNDIKE. *Educational Psychology*, 1903, Ch. IV.

ABSTRACTS AND REVIEWS.

J. O. VERTES. *Das Wortgedächtnis im Schulkindesalter.* Zeitschrift für Psychologie, 63: October, 1912. 19-128.

This monograph gives a detailed report of an experimental study on the word memory of children, conducted during the period from October 22, 1906, to March 11, 1907. As subjects for the study, two groups of school children, totaling 128, from the ages of 6 to 11 years, and evenly distributed over the first six grades of the city schools, were selected by their teachers. This selection was made from several different types of schools, so arranged as to give about as many children of well-to-do parentage as of poor parentage. The groups included 80 boys and 48 girls.

Aim.—To determine (1) the extent or range, (2) reaction time, and (3) general memory efficiency of school children; also the relation of each of these factors to age, school grade, general school ability, sex and social status.

Method.—The "sense word-pair method" was used, the experimenter pronouncing to the subject a pair of words (catch word and reply word), *e. g. blau-rot, gross-klein,* etc., indicating to the child that on later hearing the first word he is to reply with the second or reply word. Definite explanatory tests were first given to make clear what was to be done. Test material consisted of five sets of word pairs, the first two sets of six pairs each and the last three of nine pairs each, 39 pairs in all. Extent of memory was tested by giving words after an interval of 24 hours and of one week, time being recorded and answers entered as correct, incorrect or corrected. Test words were so selected as to avoid (1) any aid through association; (2) repetition of test words; (3) similar sounding words; (4) words which could be reversed or combined; (5) words of more than one meaning.

Organization of Data.—In working up the material the writer used the Ranschburg formula for memory efficiency, which takes account of the time reaction as other formulæ do not: $M = \frac{A}{T}$; where

M = memory efficiency; A = extent of memory; and T = time. In computing A, however, a separate formula was used, $A = p + \frac{c}{2}$ where p = precise answers and c = corrected answers. It will be noticed that the corrected answers were arbitrarily scored as of half value of correct answers.

From various tabulations of his data the writer discusses in detail the extent, time and general memory efficiency, analyzing the differences in rate of learning, span of apprehension, difficulties in results in each case as to grade, age, sex, general school ability and social status. In addition to the above essential elements he also gives the correlations of the corrected, incorrect and absolute O-reproductions, a discussion of the rôle of retention and of the effect of the adjustment of the subjects to their work.

Conclusions.—1. Extent of Memory: (a) The extent of memory varies directly with school grade. (b) It varies directly with age, from 6 to 11 years. (c) A close parallel is found between extent of memory and school ability. (d) The range of memory in girls is somewhat greater than that of boys. (e) Children of well-to-do parents excel those of poor parents.

2. Reaction Time: (A) Correct Reproduction. Relation of time to—(a) School grade: Time shows constant decrease with rising grades. (b) Age: Time varies inversely as the age with boys and with girls to age of 10-11 years, there being a sharp break in the time curve at this point. (c) Curves show shorter reaction time for pupils of better general school ability, less difference being noted among pupils of grades V and VI than among those of the lower four grades. (d) Sex: Girls react more quickly than boys. (e) Well-to-do pupils react more quickly than poor pupils.

(B) Relation of extent of memory to time: The relationship is shown in general to be inverse.

3. Memory Efficiency.—Using the Ranschburg formula, $M = \frac{A}{T}$, the general memory efficiency of the subjects ranged from 8.25 per cent. to 76.9 per cent., the probable mean being 42.85 per cent. and the greater part of the results ranging from 40 to 60 per cent.

General Conclusions.—Memory efficiency varies directly with (1) school grade (from grades I to VI); (2) age from 6 to 11 years;

(3) general school ability; (4) girls have a higher memory efficiency than boys; (5) children of well-to-do parents show higher efficiency than those of poor parents.

The care which was taken to secure data under normal school conditions, and the minute analysis to which the data were subjected, make this study a contribution of value. It is quite evident, however, that further experimentation is necessary in the correlation of word memory with sex and social status. On the meager data secured by the writer one hardly seems justified in making broad generalizations.

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University of Illinois.

STUART A. COURTIS. *Report on the Courtis Tests in Arithmetic.* A Part of the Report of the Hanus Commission on Educational Aspects of the Public School System of the City of New York. New York: Committee on School Inquiry, 1913. Pp. iv, 158.

In the preface to his report Mr. Courtis calls attention to the novel and specific character of work with educational tests, and to the necessity of understanding the tests themselves in order to evaluate the results obtained from their use. Accordingly he devotes 30 pages to a history and description of the tests, and in this section presents perhaps the most detailed and elaborate account of their construction that has yet been published. In view of the fact that the report is not accessible to the general public, and perhaps will not be for some time, the following summary of average scores is presented:

Grade.	No. tested.	1. Add.	2. Subtr.	3. Mul.	4. Div.	5. Copy.	6. Sp. Reas. Att.	6. Sp. Reas. Rt.	7. Fund. Att.	7. Fund. Rt.	8. Reas. Att.	8. Reas. Rt.
IV.....	5396	41.9	29.5	28.7	26.6	75.35	3.5	1.8	8.8	4.2	3.1	.7
V.....	5836	50.2	36.8	35.0	34.7	85.5	4.4	2.3	10.9	5.8	3.1	.9
VI.....	5670	56.9	41.0	38.3	39.7	92.5	5.1	3.0	12.5	7.0	3.1	1.3
VII.....	4771	62.2	45.8	40.9	44.6	100.	5.5	3.7	14.0	8.5	3.3	1.7
VIII.....	4502	69.5	52.2	45.8	50.9	106.8	6.0	4.4	15.7	10.1	3.5	2.1
IX.....	440	71.6	52.2	46.5	52.5	98.8	6.1	5.1	15.7	10.9	3.6	2.5
X.....	257	71.7	55.3	46.8	52.7	104.5	6.0	5.1	16.1	11.5	3.5	2.6
XI.....	179	73.9	55.2	48.6	54.2	109.4	6.2	5.1	15.4	10.5	3.6	2.7
XII.....	120	74.2	54.1	46.6	55.0	105.6	6.7	5.7	16.0	11.0	3.8	2.7

The author does not stop with a mere presentation of his results in tabulated form. More than half of the report is devoted to a discussion of the results and a retabulation of the data from different points of view. The great overlapping of grades which is seen in the detailed tabulations reveals the low efficiency of arithmetic work in the schools. This is due to the fact that the same amount and char-

acter of work is offered to all pupils without any regard to individual differences in arithmetical ability. The result is a selective response in the capacities developed and great unevenness in the product. In this respect New York is no worse than other places where the tests have been tried. Rather it is a general uniformity of routine in the teaching of arithmetic which is here revealed, and the results point to a lamentable neglect of individual differences in pupils, and of the adjustment of arithmetic work to their needs and capacities. Classes move as wholes, and this treatment results in some pupils being undertrained and others overtrained. Ideally each pupil should have just training enough to bring his attainments up to standard, but this involves a study of individual capacities which is attainable only by the use of scientific tests.

Other interesting features of the report are a comparison of reasoning with fundamentals (New York children excel in the former, but are below standard in the latter), a study of relative accuracy (in which the pupils tested rank low), the influence of abstract work on reasoning, the diagnosis of individual defects, records of growth in arithmetical ability, defects in the course of study, the effects of special classes, special methods of drill, and the evidence of sex differences. A very important and illuminating chapter deals with the results of tests applied to selected groups of employes in Wanamaker's department store, New York City. In these the antagonism between routine and reasoning came clearly to view.

On the whole the report is a noteworthy contribution to the experimental study of school activities, and it is devoutly to be hoped that the Board of Estimate will authorize the printing of a sufficient number of copies to enable the study to be widely read and thoroughly digested. J. C. B.

F. H. HAYWARD. *The Psychology of Educational Administration and Criticism.* With an Introduction by John Adams. London: Ralph, Holland & Co., 1912. Pp. xvi, 592.

This unique book is described on the title page as a "Sequel to the Holmes Circular." From this one might infer that it is largely controversial in its character; as a matter of fact the author has gone far beyond the limits indicated by his sub-title, and has produced a keen, clear-cut analysis of the factors involved in school supervision. The Holmes Circular furnishes an admirable text for the discussion,

but we venture to predict that Dr. Hayward's book will be remembered long after the circular that inspired it has been forgotten.

The question at issue in the Holmes circular has reference to the relative value of general culture and specialized training and experience in qualifying a candidate for an inspectorship of elementary schools. Mr. Holmes, it seems, favors the attitude of "complete detachment" that may characterize the candidate who has not been subjected to the specific discipline of the work that he is delegated to supervise. An inspector of this type is much more likely, Mr. Holmes believes, to approach his work with "freshness and originality," and hence with a measure of efficiency otherwise lacking.

Part I of Dr. Hayward's book considers in three chapters the implications of this doctrine of "complete detachment." While granting the importance of the broad foundation, he argues clearly and convincingly for the primacy of specific preparation and discipline.

In Part II—Studies in Egoism—the author makes a distinct contribution to the theory of administration. If the psychology and pathology of egoism supplies the key to most of the secrets of adult life, it must, he believes, also supply the key to many administrative secrets. Hence he devotes five chapters to a description of the egoistic attitude. Parental egoism, professional egosim (represented by the priest, the physician, the lawyer), official egoism, the egoism of the critic, of the criticized, of the blunderer, and of the inefficient, are illustrated by pointed examples. That "human egoism is, perhaps, the most serious hindrance to educational progress" is a safe inference to draw from the evidence presented.

Another hindrance, scarcely less significant, is discussed in Part III, Studies in Educational Opinion. The present chaotic condition of educational theory—the lack of agreement upon the most fundamental issues among those who write upon the subject—is revealed by clear-cut analyses of typical doctrines now in the field. The chapter devoted to the educational maunderings of Bernard Shaw is especially good.

Part IV deals with the theory of educational statistics, separate chapters being given to a readable exposition of the frequency curve, variability and correlation.

The remainder of book—more than one-half in all—is made up of fifteen chapters dealing with the general problems of administration. The relation of teacher to supervisor, the factors that condition ap-

pointment and promotion, salaries, examinations and inspections are among the topics treated.

Aside from the vivacity and freshness of its style, the chief merit of Dr. Hayward's book is the balance that it preserves—an expression of the clear perspective through which the author views a most complicated and difficult problem. One feels that one is following the competent craftsman whose intimate mastery of a specialized technique justifies his irritation at those who, without serving an apprenticeship, insist on blundering their way through a maze of unfamiliar details. Too many of our educational books are amateurish, and consequently valueless; they lack craft spirit and craft pride. Laymen might have written them—and most of them have been written by men who are in effect laymen. As a result, our discussions seldom rise above the amateurish level. We are continually starting; we seldom arrive. Dr. Hayward has served his apprenticeship and writes out of his experience; but the wealth of allusion and citation from non-professional literature with which he reinforces his judgments proves that he is no narrow-visioned specialist. We need more of this kind of writing in education; and we need it from men who, like Dr. Hayward, are not afraid to call meddling and muddling by their right names, and to tell amateurs when it is time for them to quit playing with intricate machinery.

W. C. B.

E. W. SCRIPTURE. *Stuttering and Lisping.* New York: Macmillan, 1912. Pp. 250.

Dr. Scripture has here given us a most useful and timely contribution to the theory and treatment of speech defects. The book is remarkable, in that it represents the results of many years of research by a psychologist-physician, is full of original ideas, serves as a manual for the physician and clinical psychologist, and yet is written in such simple and lucid style that every public school teacher should be able to read it with pleasure and get much immediately usable knowledge from it.

The book is divided into three parts. The first treats of stuttering and the second of lisping, while the third contains specific exercises for clinical use. Stuttering, including stammering, is found to be essentially an anxiety-psychosis. The whole treatment is based on this theory and consists in the establishing of self-confidence, self-

control, correct use of the organs of speech, etc. Negligent lisping, organic lisping, neurotic lisping and "cluttering" are described as different speech defects, and at every point suggestions for treatment are offered. The section on exercises is full and clear and will undoubtedly prove exceedingly serviceable both to the experts who treat speech defects in clinics and to teachers and parents who may be prepared to treat cases which come under their observation. Since speech defects usually develop gradually, a book of this kind will be of great service in causing the detection and early treatment of the ailment.

C. E. S.

WALTER SARGENT. *Fine and Industrial Arts in Elementary Schools.* Boston: Ginn & Co., 1912. Pp. 132.

There is little doubt that the motor or constructive aspect of human thought has suffered in American education. In spite of our boasted practicality (which by our detractors is denominated sordid money getting), our elementary education has been dominated by traditional subjects for which a formal rather than a utilitarian value has been claimed. One of the great services which psychology has rendered education lies in the destruction of this belief in formal values and the revaluation of school subjects in terms of their actual contribution to the development of behavior. In this the arts are beginning to receive their tardy but deserved recognition. Modern psychological theory is laying more and more emphasis upon the motor aspect of consciousness, and education is slowly endeavoring to incorporate this theory into the actual training of the youth. The little work under review forms a noteworthy contribution to the development of this movement, in that the attempt is made to establish every phase of art instruction upon the interests and capacities of the child.

Chapter one contains a general discussion of the values of fine and industrial arts in education. Heretofore art instruction has been relegated to special teachers, and the work has been casual, fragmentary, haphazard, and regarded with indifference, if not opposition, by regular teachers. Now it is coming to be recognized as a vital part of school work, and the public is taking the stand that the person who cannot sing, draw, paint and model has no business in school teaching. In our best training schools for elementary teachers these subjects constitute an important part of the curriculum, and candidates are rigidly examined for proficiency in them. What,

then, are the functions of the various subjects taught under the head of manual arts in elementary schools? How can instruction be organized so that progress shall be evident from year to year? What are reasonable standards of attainment at any given stage? These are the fundamental questions which the remainder of the book attempts to answer, and the answers offered deserve the careful consideration of every student of child behavior. In each of the grades from I to VIII the abilities of the child are examined from the four points of view of representation, construction, design and color, and an effort is made to adjust the school work to the child. Drawing is a form of language, and undergoes changes similar to language. At first it is wholly imaginative, and the child's tendency to illustrate ideas by crude pictographs should be encouraged. There should be much drawing by the teacher, not for copy, but to stimulate drawing activity and to furnish mental standards. In the middle grades the drawing becomes increasingly representative, and more attention may be paid to accuracy of form. It is a mistake, however, to imagine that one draws what one sees. Drawing is always selective, and those aspects of the object must be seized upon which will best represent the idea in the child's mind. The emphasis throughout is on the expressive rather than on the receptive side. The statement that "the child must be taught to see" is inaccurate. Rather must he be taught to select certain aspects of the manifold which he sees, and this selection must be determined by what he desires to represent. In the higher grades the play spirit gives way to more purposeful activity, and with increasing control and technical facility emphasis can be laid upon proportion, the representation of the same object in different positions, map drawing, the use of shadows, blueprint work, descriptive, memory and imaginative drawing. Rapid sketching is urged in place of an excessive amount of slow, painstaking work. Above all, it must not be forgotten that ability in exact delineation comes only from exact reproduction, that rapid sketching is learned only by rapid sketching, and that facility in expression is gained only by much drawing from memory and imagination.

The discussions of construction, design and color are full of valuable suggestions from the psychological point of view, and the work as a whole constitutes an excellent illustration of the type of pedagogical monograph which may be expected from earnest, progressive teachers who are alive to the psychological aspects of their work.

J. C. B.

THE
JOURNAL OF EDUCATIONAL PSYCHOLOGY
INCLUDING EXPERIMENTAL PEDAGOGY, CHILD PHYSIOLOGY AND HYGIENE, AND EDUCATIONAL STATISTICS

Edited by

W. C. BAGLEY, C. E. SEASHORE,
J. CARLETON BELL, Managing Editor. GUY MONTROSE WHIPPLE.

Published monthly except July and August by
WARWICK & YORK, INC.,
BALTIMORE, MD.

Manuscripts for publication, books or other material for review, and news items of interest to educational psychologists should be addressed to The Managing Editor, J. Carleton Bell, University of Texas, Austin, Texas. Research contributions from England may be sent to W. H. Winch, Esq., Melville Villa, Overhill Road, Dulwich, London.

The Journal is issuing a series of Monograph Supplements for the publication of more extensive researches in educational psy hology. For details prospective contributors may apply to Guy Montrose Whipple, Cornell University, Ithaca, N. Y.

The price of the Journal will be advanced to $2.50 per year of ten monthly issues with the January, 1914, number. Renewals and subscriptions beginning with any of the remaining 1913 issues will be billed at 15 cents for each 1913 issue and 25 cents for issues extending into 1914.

Subscriptions and correspondence concerning business matters should be sent to Warwick & York, Inc., 19 W. Saratoga St., Baltimore, Md.

VOLUME IV SEPTEMBER, 1913 NUMBER 7

EDITORIAL.

RESOLVED: THAT CHILDREN SHOULD CHOOSE THEIR PARENTS.

The present interest in eugenics gives fresh significance to the saying that a child ought, in all justice, to have some voice in the selection of his parents. Pending the elaboration of some plan which will make this possible, a little attention might profitably be devoted to the problem of what parents should be chosen, provided the choice were given. The eugenist would doubtless answer this question with a nicely-balanced series of equations, in which all desirable unit-characters would gradually resolve themselves into the superman. Let us leave him to this task, and humbly content ourselves with an examination of that ubiquitous record of achievement (and near-achievement), *Who's Who in America.*

In this volume one finds the names of some 18,000 men and women who are assumed to stand out from their fellow-countrymen because of something that they have accomplished. Taking this assumption at its face value for the sake of the story, and assuming that any prospective human being who might be endowed with the power of choosing his parents would desire to attain at least this measure of

distinction, let us see whether a study of this volume will provide him with a criterion for choice.

Unhappily, while most of the men and women here listed kindly inform us as to the names of their parents, only a small portion give us the data that our prospective superman might use. But a few do happen to furnish one of these data—they state the occupational group to which their fathers belonged. This information they give, sometimes directly, but more often indirectly; that is, by stating the title of the father—Doctor, Reverend, Professor, Captain, Judge, Honorable, and the like. It is fairly safe to assume that most of those with titular parenthood give the titles in naming their fathers. In any case, it is safe to assume that those who do not give these titles when they might are fairly equally distributed among the "titled" occupations.

Having employed a few hours of our abundant "academic leisure" in making a count (we took about 3000 names on a random picking, and found that the proportions did not vary significantly after the first 500), we are prepared to say that the prospective candidate for distinction in America would do well to choose as his father either a clergyman or an army officer or a naval officer. The clerical group, while represented by only three in the thousand of the occupational population, appears to furnish about 55 in the 1000 of "eminent" men and women. This would have to be corrected, of course, for the celibacy which is imposed upon a proportion of the group; and if this correction were made, the good showing of clergymen's families would be even more striking. The medical group (even counting as physicians all those who are given the title of "Doctor,"—and some of these are probably clergymen and not physicians)—appears to furnish, in proportion to its numbers, a little more than half as many men and women of eminence as the clerical group. The academic group makes only a fair showing,—but one cannot safely generalize because of the relatively large occupational group which teaching represents; and the loose use of the generic title of "Professor" precludes us from making special groupings.

Men in public life seem to possess fairly good advantages as parents (measured by our present standard), but on the whole the anxious candidate for the eminence of "Who's Who" would better choose either the clerical or the medical group,—unless he take the military and naval group, which appears on the surface to be by far the best

of all. But here again it is difficult to generalize. Is a "captain" a military or naval officer, or is he a lake captain or a police captain,—or a captain of industry? Is a "Colonel" a professional soldier, or is he a merchant who has served for a brief period in the militia,—or is he a colonel by "courtesy"? With "Reverend" and "D.D.", however, there can be no doubt; and, because of the regularity with which clergymen's children pop up as eminent men or women, it is our opinion that this is the group to choose.

Nor does it seem to make much difference in what specific group the candidate for eminence wishes to cast his adult career. The clerical group furnishes nearly as many eminent physicians and surgeons in proportion to its numbers as the medical group; more eminent jurists absolutely than jurists themselves; a goodly sprinkling of eminent engineers; a few eminent farmers; some captains of industry; and college professors without number.

What the orthodox eugenists of the Galton persuasion would advance in extenuation or condemnation of the clergy for thus seeming relatively to monopolize this field is perhaps an idle speculation. Our directory is well within Galton's standard: its names aggregate one in the five thousand of the population, while he was satisfied with one in the four thousand as the criterion of eminence. Does the clerical group as contrasted (for example) with the medical group, "select" a type possessing hereditable characters making for eminence?—or, more justly, did it select such a type forty, fifty, or sixty years ago at the period when the leaders of the present generation were "a-borning"? The contention is plausible; but common sense suggests at once that the superior culture, discipline, and training which the members of this group commonly furnish for their children are equally plausible as conditioning factors. Granting somewhat exceptional native capacity, these seem to be the factors that "load the dice." And, if those to whom we delegated the problem of discovering a means by which children could choose their parents find the task a trifle too difficult for immediate solution, is it too much to suggest that (pending the final balancing of dominants and recessives in the eugenists' equation) leisure to devote to one's children, knowledge with which to inform them, culture with which to inspire them, and *the deepest sense of responsibility for their well-doing* may, if represented as effectively in the general population as in this single occupational group, help the race on a bit toward the era of the superman? W. C. B.

NOTES AND NEWS.

In the University Exposition, held this spring at the University of Kansas, the School of Education, under the directorship of Dean Charles Hughes Johnston, played a prominent part. The main sections of the educational exhibit were History of Education in Kansas, shown by charts, maps, photographs, text-books, etc.; Educational Psychology and Mental Tests, in which demonstration and test apparatus were so arranged that actual tests could be made; School Hygiene and Physical Tests, School Administration and Statistics, Relation of School and College, and the Practice School. Such exhibits are of value not only in acquainting the people at large with the work done in a modern department of education, but in convincing some of our skeptical academic brethren that education is taking itself seriously.

The Annual Swarthmore Conference of Teachers was held at Swarthmore College, April 26, 1913. Features of the conference were addresses by Stanley R. Yarnall on "The School from the Classical Standpoint," W. D. Lewis on "The School from the Industrial Standpoint," and Robert C. Brooks on "The Teacher and the Cost of Living."

At the meeting of alienists and neurologists, held under the auspices of the Chicago Medical Society, June 23-25, 1913, the following topics were included among the discussions: "Ways and Means of Preventing Physical and Moral Degeneracy," by G. M. Hill; "Some Data Gathered in a Study of 269 Murderers," by Rock Slyster; "Are Criminals Insane Individuals?" by C. H. Anderson; "Constitutional Immorality," by Paul E. Bowers; "The Proper Care and Sterilization of Mental Defectives," by H. M. Cary; "The Need of Some Systematic Method to Determine the Mental Integrity of Employes of Railroads and Other Transportation Companies," by Theo. Diller; "The Psychological Clinic as a Eugenic Agency," by Clara Harrison Town; "The Diagnosis of Feeble-mindedness," by Henry H. Goddard; "Some Types of the Feeble-minded," by C. B. Caldwell; "Inheritance of Some of the Elements of Hysteria," by C. B. Davenport, and "Social Hygiene as an Aid in Preventing Mental Diseases," by William House.

The subject of co-education or the segregation of the sexes in school work is a vital one and has been the occasion of much heated argument. What fragmentary experimental evidence we have on it seems to show very little difference between boys and girls in psychological and pedagogical aspects. A noteworthy attempt is now being made to collect all this evidence and sift it according to scientific standards. At the third German Congress for Paidotechnics and Paidology (Association for School Reform), which is to meet at Breslau, October 4-6, 1913, two days are to be devoted to the subject of "The Difference Between the Sexes and Its Significance for Public Education." In connection with this there is to be a scientific exhibit of materials and data contributing to a "comparative paidology of the sexes." The exhibit will include: (1) Graphic representations of the results of experimental or statistical investigations on the psychology of the sexes. (2) Comparative collections of drawings, modelings, literary productions, handwork, technical constructions, etc., of boys and girls. (3) Comparisons of grades, class standings and school exercises in mathematics, languages, etc. (4) Comparative studies of expression, as in handwriting, speech, etc. (5) Materials on comparative criminal psychology and moral statistics of boys and girls. An effort will be made to collect specimens of work from children of all ages from kindergarten to university, from the abnormal as well as the normal, and from all types of social condition. The Institute of Applied Psychology, Berlin, under the supervision of its director, Dr. Otto Lipmann, is preparing extensive charts for the graphic representation of data to be found in the literature of the subject.

Prof. G. M. Whipple's Manual of Mental and Physical Tests has been translated into Russian.

WHEN SHOULD A CHILD BEGIN SCHOOL: A CORRECTION.

On page 370 of the June number of the JOURNAL I am printed as saying: "And in any case my method of measuring school progress weighted for age could not be used to test the value or otherwise of preliminary kindergarten teaching in the large cities of the States." As the whole point of the argument rests upon the assertion that it could be so used, the substitution by the printer of *not* for *now* has had a result more confusing than printers' errors usually are.

W. H. WINCH.

CURRENT PERIODICALS.

(In this section only such articles will be noticed as bear directly or indirectly upon the interests of this Journal.)

THE JOURNAL OF EXPERIMENTAL PEDAGOGY. Vol. I, No. 1, March, 1911. W. H. WINCH. *Social Class and Mental Proficiency in Elementary School Children.* 9-18, 118-128. A comparison of examination marks to determine the differences in mental ability referable to differences in social status. Pupils of the same school were divided into two classes according to the kind of house in which they lived. The "poor" children were older for their grade than the better class children, and in general showed less proficiency in their studies. The greatest inequalities were found in arithmetic, spelling and composition.

KATHARINE L. JOHNSTON. *Mr. Binet's Method for the Measurement of Intelligence.—Some Results.* 24-31. A preliminary study of two hundred and eighteen girls from six to sixteen years of age on the basis of the 1908 tests. The seven-year tests seem too easy, while those for ten and twelve years are too difficult.

P. SANDIFORD. *Measurement in Education.* 31-38, 215-222. A study of the heights and weights of fifty Manchester grammar-school boys is made the basis for a discussion and exemplification of the methods of statistical manipulations in educational investigations.

GLADYS W. MARTIN. *The Evidence of Mental Fatigue During School Hours.* 39-45, 137-147. Tests were made on seven children, each twelve years old, at 9.45, 11.45 and 3.45 each day for seventy-six days. The tests were (1) copying a pattern in such a way that the chief factors involved were speed and accuracy of perception; (2) space threshold of the skin; (3) speed of multiplication, using the Kraepelin reckoning books; (4) dynamometer and ergograph tests. The results were negative in all cases, *i. e.,* there was no evidence of depreciation due to fatigue in any of the activities tested.

C. BURCHENOUGH. *The Psychological Bases of School Geography.* 45-51, 128-136. An interesting experimental study of the sense of direction and orientation in young children, and the application of this to geographical orientation. Few children under sixteen think of direction apart from some conventional representation of it. The globe is essential in gaining clear ideas of direction.

W. G. SLEIGHT. *Memory Training—Is It General or Specific?* 51-54. A condensed account of extended experiments in immediate and delayed recall, with children and adults, practiced and unpracticed. There was no general improvement of practiced over unpracticed subjects, but practice in poetry and tables increased efficiency in nonsense syllables (where rhythm was prominent), and practice in prose substance *diminished* ability for mechanical memorizing, *i. e.,* nonsense syllables.

No. 2, November, 1911. C. BURT. *Experimental Tests of Higher Mental Processes and Their Relation to General Intelligence.* 93-

112. An important investigation of the reasoning activities of nearly 100 boys and girls from 11.5 to 13.5 years of age in two Liverpool schools. Fourteen tests were used, many of them new, and the correlations of results were carefully worked out.

E. P. CULVERWELL. *The Creation of a Memory.* 160-161. A brief account of a very interesting experiment in developing a language memory in a boy who was decidedly defective in this respect, but otherwise above the average ability.

No. 3, March, 1912. P. B. BALLARD. *What London Children Like to Draw.* 185-197. A study of the drawing interests of 20,000 children between three and thirteen years. Nine classes of objects are considered, and the preference curves at different ages throw much light upon mental development.

G. ROSSOLLIMO. *Mental Profiles.* 211-214. A graphic method of representing mental ability as determined by thirty-four tests. The device deserves careful attention and study by all those who are interested in mental tests.

EDMUND J. GILL. *Methods of Teaching Reading.* 243-248. An experiment in rate of reading unspaced prose.

No. 4, June, 1912. W. H. WINCH. *A Motor Factor in Perception and Memory.* 261-273. New material is better observed and remembered by drawing or writing it rather than by merely looking at it. If the material is relatively familiar, the writing or drawing is a hindrance rather than a help.

CYRIL BURT AND ROBERT C. MOORE. *The Mental Differences Between the Sexes.* 273-284, 355-388. A discussion of the theory of measurement of sex differences is followed by a survey of the results of experimental investigations up to date, and a tabulation of the authors' own observations. With few exceptions innate sex differences of mental constitution are surprisingly small, and they tend to diminish as we pass upward from simple processes of sensation and movement to the more complex processes of reasoning.

P. B. BALLARD. *Sinistrality and Speech.* 298-310. A statistical investigation shows that stammering is much more frequent among left-handed than right-handed children. It is rare among those who always write with the left hand, but frequent among those left-handed children who have been taught to write with the right hand. Writing should always be done with the superior hand exclusively.

EDMUND J. GILL. *The Teaching of Spelling.* 310-319. An experimental test of the spelling efficiency of school children and an analysis of the errors made. Children taught to read by the sentence method can spell as well as, if not better than, children who have been taught synthetically.

A. P. WEISS. *The Ebbinghaus Conjectural Method of Examination.* 320-334. Several illustrations of the "conjectural" or completion method lead to the conclusions that it (1) saves the time of both student and instructor, (2) rewards consistent work and penalizes sporadic methods of study, (3) shows high correlation with the

marks which might be expected from a study of the normal curve, and (4) enables the student at all times to estimate his own standing in class. It is held to be superior in every way to the usual question and answer method of examination.

No. 5, December, 1912. GEORGE RUTHERFORD JEFFREY. *Some Observations on the Use of the "Reckoning Test" with School Children.* 392-396. Eighteen children, nine boys and nine girls, were divided into three groups (bright, average and dull), and were tested for 15 minutes on each of five consecutive days with the Maloney modification of the Kraepelin Reckoning Test. The bright boys were very much better than the bright girls, but the average and dull girls surpassed the average and dull boys. The improvement for boys was, bright, 90.9%; average, 62.9%; dull, 47.4%. That for girls was, bright, 58.9%; average, 67.2%; dull, 91.1%.

Vol. II, No. 1, March, 1913. JAMES DREVER. *Notes on the Experimental Study of Writing.* 25-29. A description of a new method of registering writing pressure and a criticism of the Thorndike scale. The apparatus for indicating pressure avoids the movable writing surface, and takes the reading directly from the pencil point.

No. 2, June, 1913. W. H. WINCH. *Should Young Children Be Taught Arithmetical Proportion? Part I.* 79-88. A theoretical analysis of the beginnings of proportional association, and a series of experiments with first-grade children to test the validity of this analysis. The results show that such children have a somewhat surprising facility in dealing with the conditions of proportion.

E. O. LEWIS. *Popular and Unpopular School Subjects.* 89-98. A statistical study of the preferences of 8000 pupils from grades II to VII (7-14 years) gives the following ranking, beginning with the highest: Drawing, manual subjects, history, reading, singing, drill (physical exercise), arithmetic, science, nature study, dictation, composition, Scripture, recitation, geography, grammar. The reasons for these rankings form very interesting reading.

C. W. VALENTINE. *Experiments on the Methods of Teaching Reading.* 99-112. An experimental test of the phonic method of teaching reading as compared with the "look and say," or word method. Selections of simple English were written in Greek characters in such a manner that if the proper sounds were given the Greek letters the English word would be pronounced. Tests were made on adults, elementary school children and kindergarten children. The results were strikingly in favor of the phonic method for all except the very dull children.

B. DUMVILLE. *A Trial of Binet's Tests on Five-Year-Olds.* 113-118. The tests were used to compare two parallel classes in an infant school. The number of children tested was 89. Three children showed a mental age of 4, 15 of 5, 41 of 6, and 30 of 7. The average age was 6.1, showing that these tests are too easy. The fact that just as many correct answers were received from the seven-year tests as from those for six years points to a serious defect in the scale. The

Spearman foot-rule correlation between the results of the tests and the ranking of the teacher was only .43.

ROBERT R. RUSK. *Analysis of the Spelling Errors of Adults.* 119-122. Errors due to faulty expression included (1) words not completed, (2) words wrongly completed, and (3) words substituted for those given. Those due to faulty apprehension resulted from (1) improper pronunciation, or (2) defective phonetic analysis.

STANLEY WYATT. *The Correction of Errors.* 122-127. A series of experiments involving the effect of practice with and without knowledge of results in accuracy of movement, spelling and arithmetic. The greater improvement where the results are known affords a strong argument for correcting papers and requiring pupils to study the corrected forms.

P. B. BALLARD. *What Children Like to Draw.* 127-129. An examination of 10,000 drawings of Welsh children, who were asked to draw whatever they preferred, reveals the same types of preference as London children show (see above). The boys' favorite object for drawing is a ship; the girls' some form of plant life. Nine is the age of minimum interest in drawing human beings. Eight years is the age of maximum interest in drawing both houses and animals. Fondness for sketching vehicles is greatest at six.

SCIENCE. N. S., Vol. xxxviii, August 1, 1913. DEXTER S. KIMBALL. *Practical Work in Science Teaching.* 144-149. Science teaching should not become abstract and formal, should not lose its intimate touch with practical affairs, but on the other hand it should not fall into the opposite error of dwelling too much on the concrete. In all the present emphasis upon the interest of the pupil we must not forget that "nothing worth while has ever been gained without toil, trouble and tears."

August 15, 1913. FREDERIC LYMAN WELLS. *The Principle of Mental Tests.* 221-224. Two broad functions of psychological tests are (1) the measurement of changes in individuals under controlled conditions, and (2) the measurement and interpretation of differences between individuals under similar immediate conditions. The problem is to construct a test that shall be free from inaccuracies and at the same time significant for the subject's adaptation to life. The interpretation of tests is, therefore, as important as their application. The tendency to make tests approximate the conditions of practical life is a commendable one.

August 29, 1913. GEORGE W. CRILE. *A Mechanistic View of Psychology.* 283-295. Psychology must be redefined as the science of man's activities as determined by the environmental stimuli of his phylogeny and of his ontogeny. The author develops a theory of brain patterns, each with its own connection with the external world, each attuned to receive impressions of but one kind. Thought, will, perception, memory, emotion, reason, and the like, are to be interpreted in terms of these brain patterns, and depend on the stimuli which are able to secure the final common path.

PUBLICATIONS RECEIVED.

(Notice in this section does not preclude a more extended review.)

FRANK P. BACHMAN. *Intermediate Schools.* New York: Committee on School Inquiry, 1913. Pp. 43.

Intermediate schools in New York City are schools in which seventh and eighth year pupils are segregated. There are three such schools, organized to relieve congestion. Not only have they done this, but they have demonstrated their value by holding and promoting more pupils than the ordinary school, by a saving in cost of equipment and operating expenses, and by increased opportunity to vary the work of the school to meet the needs of the public.

BIRD T. BALDWIN. *John Locke's Contributions to Education.* Reprinted from the Sewanee Review, April, 1913. Pp. 13.

Locke, who has been cited as a typical representative of formal discipline in education, seems to have had a clear realization of the limitations of training, and to have anticipated some of the current theories as to the importance of studying the pupils' native propensities. Indeed his injunctions to "observe carefully for favorable seasons of aptitude and inclinations" and "teach the child when he is in tune" seem to point to a theory of nascent periods of instinct every whit as fantastic as that which is so prominent in contemporary educational discussions.

W. BECHTEREW. *La psychologie objective.* Paris: F. Alcan, 1913. Pp. iii, 478. Fr. 7.50.

Dr. Auguste Marie, in his preface to this volume, proclaims it "the text-book of the psychology of tomorrow." We are assured that the old psychology which looked within, which dealt with the phenomena of consciousness, which based its conclusions upon the methods of introspection, is antiquated and discredited. The new psychology is a strictly objective science, and reduces all mental as well as physical activities to reflexes. We have simple reflexes, instinctive reflexes (sic), neuro-psychic reflexes, mimetic reflexes, reflexes of nervous concentration, symbolic reflexes, and personal reflexes. The task of expressing thought activities in neural terms is a congenial one for a certain type of speculative mind, and may have its value in revealing new points of view for the interpretation of familiar data. We know so much more, however, about the rela-

tions between our thoughts than we do about the mechanism of reflexes, that such interpretations are as yet largely hypothetical.

SUSAN BLOW, PATTY HILL, AND ELIZABETH HARRISON. *The Kindergarten.* Boston: Houghton Mifflin, 1913. Pp. xvi, 301. $1.25. net.

Whatever may be the ultimate judgment of educators upon the Montessori methods, there is one aspect in which the present Montessori propaganda promises beneficial results for education in America. The agitation puts the old-time Froebelian kindergartner on the defensive, and provokes an evaluation of kindergarten methods. The charge has been made against the kindergarten that, although unhampered by school regulation, and furnished with unrivalled opportunities for the study of the child, it has contributed practically nothing to our scientific knowledge of child development. Doubtless the most important reason for this is the blind, almost idolatrous, acceptance by kindergartners of principles and methods bearing the stamp of the Froebelian tradition. The whole attitude has been one of the reverent study of revealed truth, rather than the scientific observation of actual children. It is true that the enthusiastic Montessori propagandist shows little superiority in this respect. But in the clash of opinion there is almost certain to be an appeal to direct observation and experiment. Even before the Montessori methods became an issue, there was dissatisfaction within the kindergarten ranks, and in 1903 a special committee was appointed by the International Kindergarten Union to "formulate contemporary kindergarten thought". This committee has persisted, with some changes in membership, for ten years, and the present volume constitutes its report. The three reports presented are supposed to represent the views of the Conservatives, the Radicals, and the Harmonists, but an examination of the book shows 230 pages devoted to Miss Blow's Conservative report, and only a scant 70 pages to the other two positions. Nevertheless it is a book which cannot be ignored by anyone who is interested in primary education, for it contains a summing up of all Miss Blow's past efforts, and a concise statement of the position of the insurgent kindergartners from the pen of Miss Hill. Is it not time for some experimentalist to attack the kindergarten problem?

Carnegie Foundation for the Advancement of Teaching. Seventh Annual Report of the President and Treasurer. New York: Carnegie Foundation, 1913. Pp. 194.

This report is especially valuable for its extended and well-balanced discussion of pension systems and their application to proposed state pension funds for teachers. Several pages are also devoted to the perplexing subject of college entrance requirements.

Specific subject requirements for entrance put a premium upon mediocre teaching in some subjects and handicap good teaching in others. Colleges should put the stamp of their approval upon good teaching in all subjects, and should endeavor to detect and eliminate poor teaching even in the most traditional and best organized fields.

GEORGE VAN NESS DEARBORN. *Kinaesthesia and the Intelligent Will.* Reprinted from the American Journal of Psychology, Vol. 24, April, 1913. Pp. 204-255.

An excellent summary of the literature on the dependence of volition upon the great stream of impulses connected with movement, an analysis of the neural substrate of volition, and a discussion of some simple experiments involving will acts.

CHARLES DE GARMO. *Aesthetic Education.* Syracuse: C. W. Bardeen, 1913. Pp. xi, 161.

Every child should have a first hand aesthetic view of the world, and it is under the influence of the teacher that this can be acquired. Our present aesthetic teaching is partial and second hand, depending on pictures of things rather than on things themselves. The writer attempts to reveal to teacher and pupil the beauty to be discovered in some of the common things of life, and one of the most interesting portions of the book is the chapter on the aesthetic proportions of tools, machines, and engines. A feature of the book is the introduction of a considerable number of original poems illustrating the aesthetic response to various situations.

DR. GUSTAV DEHNING. *Bilderunterricht. Versuche mit Kindern und Erwachsenen ueber die Erziehung des aesthetischen Urteils.* Leipzig: Quelle und Meyer, 1912. Pp. 108. M. 3.50.

This important experimental study of the aesthetic judgment investigates the questions: To what degree can the child give an aesthetic response to a work of art; at what age does this response first manifest itself, and what are its stages of development; to what extent can the response be hastened or intensified by training? Among the author's conclusions we find the following: Artistic appreciation begins not earlier than the tenth year; at thirteen there are evidences of spontaneous evaluation of art works; and from sixteen on artistic discrimination may be taught to all. The rate of improvement correlates closely with general intelligence, as indicated by class standing. No sex differences appear. The descriptive type of mind is not so favorable for artistic appreciation as the contemplative or the emotional. For young children a picture merely tells a story and has no aesthetic value, but for older children specific instruction has a decided place in developing the criteria of the aesthetic.

WILLIAM ELLSWORTH HERMANCE. *An Unorthodox Conception of Being.* New York: G. P. Putnam's Sons, 1912. Pp. x, 441. $2.50 net.

The fundamental ethical doctrine of this unorthodox philosopher is freedom from fear, and on this account his book is to be commended to the consideration of educators. "There is one thing we will recognize which I think is an equal barrier to manifestations of aspirations and inspirations, and this is, I believe, a psychic entity which I term Fear." Fears are the great inhibiting factors which crush us down, and hinder our mental, moral and spiritual progress. Hence the great ethical task is to cast out fear, and in this Faith and Love are the attitudes that must be emphasized. The author does not hesitate to frankly confess when he gets into difficulties, and the common sense way in which he graples with some of the fundamental problems of human thought inspires confidence.

IRVING KING. *Education for Social Efficiency.* New York: D. Appleton & Co., 1913. Pp. vii, 311. $1.50 net.

This is a popular discussion of various aspects of education from the standpoint of social needs. The author states in his preface that the book is not so much for the educational specialist as for busy teachers. However this may be, the book contains a clear and simple statement of some of the most important problems in current educational practice, and excellent illustrations of the manner in which these problems may be successfully attacked. After a consideration of the social origin, function and aim of education, the author turns to the rural school situation and points the way to a more highly developed social consciousness. In general the need for co-operation of the school with home and community is stressed and the utilization of social interests and incentives in the internal life of the school is urged. It is a very practical and helpful book.

VARIA KIPIANI. *Ambidextrie. Etude experimentale et critique.* Paris: F. Alcan, 1912. Pp. 104. Fr. 3.50.

A detailed examination of the physiological and neurological bases of right and left handedness, and a discussion of the pedagogical treatment adapted to these conditions. There seems to be undoubted evidence for anatomical and physiological asymmetry, but the author claims that education should endeavor to counteract this and to develop a symmetrical physique. The illustrations of simultaneous writing and drawing with both hands are interesting, if not altogether convincing as to the value of such education.

EDOUARD LEROY. *The New Philosophy of Henri Bergson.* Translated from the French by Vincent Benson. New York: Henry Holt & Co., 1913. Pp. x, 235. $1.25 net.

We have here the enthusiastic and somewhat impressionistic interpretation of a poetic philosopher. If ardor of conviction and

warmth of allegiance count for anything in the propagation of philosophical ideas, Mr. Bergson is to be congratulated upon his interpreter. And this seems to be appreciated, for in a letter to the author Mr. Bergson says: "Underneath and beyond the method you have caught the intention and the spirit. * * * Your study could not be more conscientious or true to the original. Nowhere is this sympathy more in evidence than where you point to the possibilities of further developments of the doctrine."

JAMES H. LEUBA. *A Psychological Study of Religion.* New York: The Macmillan Co., 1912. Pp. xiv, 371. $2.00 net.

This is a remarkable book, and it is certain to have a profound influence upon all thoughtful people who come in contact with it. The essential and inherent conflict between the dogmas of Christian theology even in its most modern and attenuated form and the findings of the psychology of religion is clearly pointed out, and the pathetic case of the religiously disposed scientific thinker who tries to adjust himself to any of the accepted creeds makes one pause and reflect. One of the most striking tendencies of modern education is the development of an attitude of respect for scientific truth and scientific method. This, from the nature of the case, is bound to continue, and in this way there is a growing antagonism between the basic principles of the school and the church, which reacts disastrously upon the moral and religious nature of the pupils. One of the greatest needs of the coming generation is a form of religion which will not be felt to conflict with scientific ideals, but will be based upon them, and will be big enough to include and foster them. A possible satisfaction of this need is offered in the author's suggested Religion of Humanity.

GEORGE EDWIN MACLEAN. *Present Standards of Higher Education in the United States.* Bulletin No. 511. Washington: Bureau of Education, 1913. Pp. 191.

A history of the standards of college entrance requirements in the United States, and a survey of present standards in liberal-arts colleges, and schools of theology, medicine, law, engineering, dentistry, pharmacy, fine arts and music.

DAVID R. MAJOR. *The Elements of Psychology.* Columbus, Ohio: R. G. Adams & Co., 1913. Pp. xiii, 413.

The present volume is an addition to the rapidly increasing number of introductory texts in general psychology. The treatment follows the traditional divisions of the subject matter, and is based largely on James and Titchner. Practically no account is taken of contributions published in recent periodical literature. The chapter on the nervous system contains some good cuts, but unfortunately

the full-page diagram intended to show the connection between the spinal cord and the brain is so unduly simplified as to be altogether misleading. It is somewhat surprising to find a psychologist saying: "We agree to call the consciousness which the light of a bright moon may arouse in the mind of a week-old babe—Sensation." We suggest with Royce, that it would be as well to leave the hypothetical babies out of the discussion.

ELEANOR MARCHBANKS. *School Ethics.* Boston: The Four Seas Co., 1913. Pp. 178. $1.25.

This little book represents one elementary school teacher's reaction to the problems of teaching right conduct in the public schools. The chief means employed seem to have been the judicious selection of stories, memory gems, etc., in the English work, and the emphasis on kind and thoughtful action in the composition lessons. Primary teachers will find some interesting material for story-telling in the volume. One feels that the title is somewhat pretentious for the simple tone of the book.

JULIEN OFFRAY DE LA METTRIE. *Man a Machine.* Chicago: The Open Court Publishing Company, 1912. Pp. 216.

The publication of the French text and an excellent translation of this famous work is opportune in view of the present day interest in mechanism. The book is attractively printed and bound. Frederick the Great's "Eulogy" of La Mettrie and extracts from "The Natural History of the Soul" are included. An appendix contains philosophical and historical notes by Gertrude Carman Bussey, and also a bibliography.

LAWRENCE MILLS. *Our Own Religion in Ancient Persia.* Chicago: Open Court Publishing Company, 1913. Pp. 193.

This book, by the professor of Zend (Avesta) at the University of Oxford, contains a collection of lectures delivered on various occasions for the purpose of showing the connection between Israel and Persia, and the identity of the "chief doctrines of the Avesta and the Exilic Bible."

A. C. MONAHAN. *The Status of Rural Education in the United States.* Bulletin No. 515. Washington: Bureau of Education, 1913. Pp. 73.

The author presents statistical tables comparing urban and rural schools, discusses the one-teacher country school, outlines the essentials of efficiency in rural schools, indicates the status of the rural teaching force, and sketches the status of rural school management and supervision.

GARRY C. MYERS. *A Study in Incidental Memory.* Archives of Psychology, No. 26, February, 1913. Pp. 108. $1.00.

This interesting monograph presents valuable material for the educational psychologist and the teacher. "The findings of this study seem to strike a blow at the common assumption that because a person does certain acts or work within a certain system, it necessarily follows that he has an intimate knowledge of the activity or system with which he is identified. For example the sixth grade teacher may be an expert in her teaching activities, but this fact does not insure her expertness in the capacity of analyzing the problems and existing conditions of sixth grade school work in general. These analyses may best be made by one whom is free from the daily routine of teaching."

ANNA G. NOYES, B.Sc. *How I Kept My Baby Well.* Educational Psychology Monographs, No. 9. Baltimore: Warwick and York, 1913 Pp. 193. $1.25.

This fascinating story of the first two years of a child's life contains the most elaborate scientific record of physical health and the means used to maintain it that has ever been kept. Detailed charts are presented of the record of nine typical months. From these charts one gets accurate information of the slightest changes in such matters as number of meals, intervals between meals, duration of nursing, regurgitation and vomiting, sleep, feces, skin, cold, behavior, crying, weight, and physical achievements. A goodly number of such complete records would give us adequate basis for genuinely scientific judgments on the physical development of children.

G. H. PARKER. *The Relation of Smell, Taste and the Common Chemical Sense in Vertebrates.* Reprinted from the Journal of the Academy of Natural Sciences of Philadelphia. Vol. 15, Second Series, September 7, 1912. 221-234.

A study of the reactions of fishes to chemical stimuli shows that there are three types of chemical receptors in these vertebrates, those in the nose, in the mouth, and in the skin. Of these the olfactory organ is the more primitive, the chemical receptors of the skin seem to have developed next, and finally the organs of taste became differentiated.

G. H. PARKER. *Sound as a Directing Influence in the Movements of Fishes.* Reprinted from the Bulletin of the United States Bureau of Fisheries, Vol. 30, April 27, 1912. 99-104.

Some varities of fishes move toward the source of a sound produced in the water, some move away from it, and some are disturbed by it without showing definite orientation.

LANGDON CHEEVES STEWARDSON, L.H.D., LL.D. *College Sermons.* New York: Longmans, Green & Co., 1913. Pp. x, 332.

"The primary purpose of these sermons was to stimulate religious experience in its various phases of feeling, thought and action. * * * Religion is indigenous to human nature and not an imported product, * * * and, as a thing of life, it is subject to development. Its growth involves changes in theologic statement as well as in particular objects and methods of practical endeavor."

JOHN C. STONE, A.M. *The Modernization of Arithmetic.* New York: Benj. H. Sanborn & Co., 1913. Pp. 26. Ten cents.

Work in arithmetic is begun too early. It is the most abstract of elementary school subjects, and we would do well to wait until the child grows up to it. Much more emphasis is needed on habit formation through drill. Fundamental processes must be made automatic, and much that is traditionally included in the text-books should be eliminated.

WILLIAM S. SUTTON. *Some Principles of Moral Instruction.* Reprinted from the Educational Review, June, 1913. Pp. 9.

A masterly presentation of the fundamentals of morals in the schools. The canons of moral instruction are: 1. Sense preception is the foundation of moral wisdom. 2. Moral insight is to be gained only through the guidance of reason. 3. The emotional nature must be considered. What a man loves determines to a large extent what he will become. 4. The will must be trained. "Education has for its purpose the decrease of the number of apes, as well as the number of bosses, among men, for it is immoral for a human being to be either an ape or a boss." 5. "At all times and under all circumstances instruction should preserve, defend, and promote the moral unity and integrity of the individual."

EDWARD L. THORNDIKE. *The Original Nature of Man.* New York: Teachers' College, Columbia University, 1913. Pp. xii, 327. $2.50.

No field of educational psychology has stood in such dire need of critical examination and clarification as that of instinct. The old antithesis between intelligence and instinct received a death blow with the publication of James' chapter on instincts, and later writers have not only agreed with him that man has more instincts than any other animal, but have pointed out that intelligence itself is nothing more than the complicated interplay of responses which go back in the ultimate analysis to inherited neural structure. So completely has the conception of instinct come to dominate educational thought that such important works on the principles of education as Bolton and Henderson are permeated by it from cover to cover. But much

of the literature on instinct, particularly in its relation to education, is highly imaginative, and whole courses of study have been constructed on the basis of recapitulatory activities and nascent periods of instinctive behavior. These theories are so fascinating and lend themselves so readily to the construction of elaborate educational programs that it is almost with reluctance that one inquires what support they receive from the actual study of behavior. Yet this is the crucial question that we have needed to have asked in education, and this is the inquiry to which Thorndike has directed his attention. The task has been masterfully accomplished, and we venture the prophecy that the present volume will set the standard in discussion of instincts for many years. It is true that much of the argument is negative and destructive, and that on the constructive side the author is frequently obliged to say, "Here we need further detailed studies of behavior." But the destructive criticism was urgently needed, and will serve to clear the ground of much fictitious knowledge.

JOHN B. WATSON. *Psychology as the Behaviorist Views It.* Reprinted from the Psychology Review. Vol. 20, No. 2, March, 1913. 158-177.

"Psychology, as the behaviorist views it, is a purely objective, experimental branch of natural science which needs introspection as little as do the sciences of chemistry and physics. * * * The position is taken here that the behavior of man and the behavior of animals must be considered on the same plane, as being equally essential to a general understanding of behavior. It can dispense with consciousness in a psychological sense."

ARLAND D. WEEKS. *The Education of Tomorrow.* New York; Sturgis & Walton, 1913. Pp. xii, 232. $1.25 net.

What kind of knowledge is worth while? What kind of knowledge is of sufficient importance to warrant us in requiring the coming generation to master it? The author's answer is that it is that knowledge which assists the individual in adjusting himself to the world in which he lives. From this economic point of view three classes of educational knowledge are considered, knowledge relating to production, to distribution, and to consumption, and the subjects that are available for the school curriculum are surveyed and evaluated with reference to this distinction. The author makes many wholesome observations, but scarcely justifies the ambitious title.

ALEX. WOOD, M.A., D.Sc. *The Physical Basis of Music.* New York: G. P. Putnam's Sons, 1913. Pp. viii, 163. 40 cents net.

This little volume is one of the Cambridge Manuals of Science and literature, and presents in simple form the essential facts about the air vibrations which give rise to musical tones.